

MECHANICKS MAGAZINE,

AND

Journal of Publick Internal Improvement.

NO. 1.

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VOL. I.

INTRODUCTION.

The Publick are now invited to come forward and contribute some portion of their patronage to another new Journal.—We ask no contributions to be poured into the insatiable treasuries of opposition, we solicit no aid to maintain us even in emulating the well founded periodical publications of the day, but, to the man of science, to the man of practical knowledge, and to all who are disposed to advance the Useful Arts, and the cause of Publick Internal Improvement, we earnestly and confidently address ourselves. Our object is to institute a Magazine devoted to those subjects, in which the experience of the practical may be brought to light, where the many mechanical inventions, systems, and improvements, of the ever busy ingenuity of man, may be recorded; and to elicit, to embody, and thus to diffuse, as far as may be, over the whole surface of the country, the great and growing subject of Publick Internal Improvement, the spirit of which is the characteristic of our times, and a topic upon which every mind should be busy and every heart engaged.

The vast and important subject of Internal Improvement is now quickening and circulating upon every hill and in every valley throughout the commonwealth, and every man should be made acquainted not only with the direction and extent of its advances, within the narrow circle of his own experience, but should unfold the map of his whole country and explore the advantages of every distant region that may be led to contribute its treasures to the marts of his vicinity.

In the Mechanick Arts, also, new views are continually presenting themselves, and the practicability of their operation, the accuracy of their design, their incidents, results and comparative merits, can be adequately tested and fairly displayed only through the medium of a publication devoted to their cause.

It must be obvious to every one, that these two great subjects are not dissimilar in their characters, that their combined light,

emanating from the same source, would be of great importance, and sufficient, it is presumed, to render their incorporation eminently desirable.

There is an importance in this enterprize, which will ensure its success, the moment it is duly appreciated. Much information on the subject of Internal Improvement is contained in many foreign journals, as well as in the publications on this side of the Atlantick, and among the latter, the highly respectable newspapers of the day not unfrequently signalize their pages with valuable treatises upon this important subject, but they frequently lose their intended effect for the want of an appropriate channel, and are but fugitives upon the wide waste of newspaper circulation. It is to be regretted that this fate awaits so much useful information—that it should just rise, as it were, to the surface, and then sink into oblivion; for few persons have time, money, or patience to take and search through all these various channels—and hence, the importance of the plan now proposed by the present publication. We anticipate that much matter may be elicited by opening an appropriate Magazine, and by having it understood, that the effusions of every pen, guided by the hand of utility, are respectfully solicited, and will always be thankfully received. In addition to what is proposed, we indulge the hope that these pages may one day be used as a book of reference, whereby may be exhibited, on comparison with the then existing publications, the various advances in the Useful Arts, and the Improvements made in our country.

We do not profess that every thing appearing upon our pages shall be erudite or novel, perfect, most suitable, or even expedient; but, we wish to spread a table upon which genius may lay her crude productions, and where timidity may venture to disclose her worth.

We shall rigorously exclude from our columns every article of a political, religious, or other publick controversy, and shall devote

them faithfully, to the great objects herein proposed.

The Publisher has secured to himself the talents of several highly respectable and influential individuals in the various professions necessary to conduct the proposed work. It is intended that our numbers shall appear on the first of each month, and shall be in size, 32 pages, royal octavo. The price will be \$2 per annum, payable within 3 months. An index will be furnished with the last number of each year. In the selection of the paper, regard will be had to the permanency of the work; the typographical execution shall be a specimen of the perfection to which the art (in which the Publisher feels it his pride to have been educated) has attained. Many of the subjects will be illustrated by necessary plates, as occasion may require, and as means may be afforded from the support which our enterprize may receive, to meet the expense.

We had sometime since thought of republishing in this country, the London Mechanicks Magazine, but the amount of matter in that periodical of a purely local character, and the speculations therein contained, which are so constantly anticipated by the ingenuity, talent and enterprize of our own countrymen, have induced us to confine ourselves only to occasional selections from that as well as from many other European works, which we shall from time to time furnish.

BOSTON SCHOOLS.

The most important characteristic in the mechanic classes of this city, and indeed of New-England, seems to be the education which almost every member of them has received. We do not mean to be understood as asserting, that the grade and standard of education is the same throughout our whole body, but that the great majority of our brethren in the arts rely upon something more certain than tradition for their historical information, and upon more general and enlarged basis than their individual experience for their political opinions.—That their sources of knowledge and sentiments are as various as the circumstances of their life, is, in some measure, true; but, we recur to the common schools of our country as the great foundation of our common character, and trace to them the similitude of judging and of acting, and those peculiarities of disposition, which from the foundation of the commonwealth have stamped our national reputation and have ever been our pride.

The history, the condition, and more than

all, the destiny of these schools, are subjects which every friend to the mechanic interest is especially called upon to investigate and proclaim. We venerate the spirit and philanthropy which led to their institution; we applaud the diligence and sound sense with which they have been maintained and improved, but at the same time we look forward with the expectation that the community will realize infinitely greater benefits from the perfection of the system than have ever yet been foreseen.

We intend at some future period to enter more fully into the merits and defects of our system of school education. At present we shall merely exhibit to our readers the following report of the School Committee of this city on the present number of Publick and Private Schools; the number of pupils belonging to them, and the cost of maintaining them, made in compliance with a resolve of the Legislature;—a report, in which we would congratulate the Committee, all teachers of youth, and the citizens generally, that we live in a day when the interests of learning are so liberally fostered, and for the encouraging belief that, under the blessing of God, they cannot but be attended with the most important and happy consequences.

REPORT:

The Sub-Committee, appointed at a meeting of the School Committee on the 12th day of May last, for the purpose of preparing a return of the several schools in this city, to be made to the secretary of this commonwealth, in compliance with the requirements of the statute of the 4th of March, 1826, entitled "An Act further to provide for the instruction of youth"—have attended that service and ask leave to report:

That the whole number of Publick Schools in the city is as follows, viz:

- 9 Grammar and
- 9 Writing Schools,
- 1 Latin, and
- 1 English High School for boys,
- 57 Schools for children between 4 and 7 years of age, and denominated Primary Schools,
- 2 Schools in the House of Industry, and
- 1 School, denominated the House of Reformation; the 3 last at South Boston.—Making, together,

80 Publick Schools; the several items of which, viz. the number of pupils attending schools, their ages, and the period at which the several schools were establish-

ed, are particularized in the following schedule:

Names and number of Schools.	MALES.		FEMALES.		Total.	Year situated.
	under 7 yrs.	over 7 yrs.	under 7 yrs.	over 7 yrs.		
Boston Latin....	1	141			141	1635
Eliot.....	2	204	175	379	1713	
Adams.....	2	243	225	468	1717	
Franklin.....	2	233	277	560	1785	
Mayhew.....	2	208	199	407	1803	
Hawes.....	2	72	87	159	1811	
African.....	2	20	20	40	1812	
Primary.....	57	1654	140	1553	3,513	1818
Boylston.....	2	193	185	378	1819	
Bowdoin.....	2	200	308	598	1821	
High School....	1	134		134	1821	
Hancock.....	2	216	175	391	1822	
H. of Industry..	2	43	60	103	182	
H. Reformation	1	94			102	
	80				7,430	

That the whole number of pupils at the above schools is 7,430;

That the expense of tuition, fuel, &c. for the current year, is estimated at \$52,500, as appears by the Auditors books, exclusive of any thing being considered for the rent of the buildings occupied for the schools, (excepting for the Primary Schools.) These buildings are ten in number, the average cost of which, as appears from the books at the Auditors office, is about \$20,000 each, and which your Committee put at an annual estimate for rent of \$1,200 each, and which, with a similar charge for the three schools at South Boston, of, say \$1,000 for the 3 schools, makes the total expense of the Public Schools, for the present year, \$65,500.

That the whole number of Private Schools in the city, as ascertained from a personal visit by your Committee to each school, is 155;

That the whole number of pupils at said schools is 4,018;

That the expense of tuition, &c. at said schools is \$107,702.

These are also particularized in the following schedule:

Ward No.	Schools.	Pupils.	Annual expenses.
1	10	249	\$ 3,722
2	9	180	1,476
3	8	221	2,034
4	14	297	8,104
5	13	387	5,488
6	13	284	10,588
7	23	662	22,698
8	26	832	32,072
9	4	115	1,104
10	15	325	7,184
11	9	191	4,220
12	11	255	3,012
	155	4,018	\$ 107,702

Estimated cost of tuition at Private Schools, as above, \$ 107,702

Estimated cost of tuition, fuel, &c. at Public Schools, as in report, \$ 65,500

Estimated cost of books, as follows:

1,340 being the number at Private Schools under 7 yrs. of age,

a 75 cts. each, is \$ 1,005

2,678 do. do. over 7, a \$2 25 each, is \$ 6,035 50

4,018 being the number of pupils at Public Schools under 7 years of age, a 50 cts. each, is \$ 1,759 50

3,917 being the number at Public Schools over 7 years of age, a \$2 25 each, is \$ 8,613 25

11,448 Total expense of books, \$17,600 25

Estimated cost of fuel for 4,018 pupils, a \$1 50 each, is \$ 6,027

23,627 25

\$107,702 25

And in recapitulation, it may be stated that the whole number of schools, in the city, public and private, is 235.

Whole number of pupils at school is 11,448.

Total amount paid for tuition, fuel, &c. is \$196,829 25.

Your Committee would further state, that while the numbers attending Primary Schools have increased from 2,805 to 3,513, and the private scholars from 3,392 to 4,018, say together 1,334 pupils since the year 1826, a period of three years only, (when the last return was made), the number of pupils now returned as members of the Public Schools, say for children over 7 years of age, have diminished not far from 500, with daily absences at some schools of an average of 30 to 40, and at other schools from 50 to 75, while at the Private Schools the average number of daily absences is very trifling.

All which is respectfully submitted by order, and in behalf of the Committee,

HENRY J. OLIVER.

Boston, Nov. 23, 1829.

BOSTON WATER WORKS.

A plan for supplying the city of Boston with good water for the domestick use of the inhabitants, as well as for extinguishing fires, and for all the general purposes of comfort and cleanliness, was presented about five years since by the late chief magistrate of the city to his fellow-citizens for their con-

sideration, and we are much gratified that the present mayor, in his late speech to both branches of the city council, has also revived this highly important subject. Those of our readers who attend the interesting lectures at the hall in Pearl street, one and all, were delighted, we believe, that the subject was also noticed by Dr. Channing in his recent lectures on aqueducts; and we hope the time is not far distant when the subject may be pressed with earnestness and success upon the notice of the city council, and that no financial embarrassment may impede the undertaking of this important object. Should, however, contrary to the views of the late (and we presume them to be those of our present) mayor, the city see fit to let it go out of its own hands, into those of individuals, we believe a company could very easily be formed to undertake the enterprize on private account, and with a very fair prospect of being amply compensated for their patriotism and expense. One fact alone would justify the belief that such an operation would be of pecuniary advantage, it is this—that the diminution in the premiums of insurance against fire on the property, real and personal, underwritten upon in this city, would defray, in one year, one fourth of the whole expense!

It will be borne in mind that a highly respectable and scientific individual was employed by the city to examine various sources of water in this vicinity, for the purpose of ascertaining the practicability of the undertaking referred to, and that an elaborate report was made by Mr. Treadwell on the subject. It may not be uninteresting to furnish the publick with the following extracts, touching some of the most important particulars. We do it with the hope that the subject will be continued by others, in our next Journal.

"It is a matter of no small difficulty to fix, satisfactorily, on the quantity of water which any works, worthy of the city, ought to supply. It appears by the report of a committee of the government of Philadelphia, that the former water works of that place supplied 1,000,000 gallons to the city, containing about 60,000 inhabitants, daily; this supply was found so insufficient, as to render it necessary to alter and enlarge the works, at a great expense. And it appears by the same report that their present works are capable of supplying 3,000,000 gallons, daily. The present supply of London, according to professor Leslie, amounts, to 29,160,000 gallons, daily. This quantity, he says, is abundantly sufficient; the rivalry of the several water companies having almost deluged the

streets. The population of London, within the districts supplied by the water companies, is to that of Boston, as 20 to 1 nearly; consequently, 1,458,000, gallons, distributed to this city, would be in proportion to the London supply.

Taking the inhabitants of Boston at 50,000, collected into 8000 families, and supposing each family to use 60 gallons of water for washing, and on the same day 40 gallons for all other purposes, we have 100 gallons to each family, as the greatest quantity used on any one day; and as not more than 6000 families would be likely to wash on the same day, we may take as the greatest quantity required on any one day, 6000 families, 100 gallons each, and the remaining 2000 families, 40 gallons each, making 680,000 gallons. Now, if we take the other ordinary demands, by the trades, for watering cattle, streets, &c. together with the loss by leaks and waste, at 500,000 more, we get 1,180,000 gallons as the maximum for daily consumption: allowing every family to use of the water. Making a necessary provision for the increase of the city; however, within a few years, the supply ought not to be less than 1,600,000 gallons.

I have not taken into the above account, the supply required for extinguishing fires. In such an emergency, the use of water, for most other purposes, must be forbidden, and under this condition, works capable of furnishing the above quantity of water, would supply, at a fire, over 1100 gallons a minute; a quantity equal to that used by 8 large fire engines. In addition to this, from the plan of the works which I shall propose, having reservoirs generally full in the city, a still further security, so far as a supply of water can render a city secure, will be obtained.

There are several places within the neighbourhood of Boston, from which 1,600,000 gallons of water, or more, may be obtained daily. Two of these, which appear to possess advantages over all others, have been examined, and a route from them surveyed, with sufficient minuteness, to estimate the magnitude and cost of works which will be required, to bring the estimated supply from them. These places are, Charles river above the falls at Watertown, and Spot pond, in Stoneham. The water of Charles river is at all times abundant for the supply of the city, although it is not sufficiently elevated to be distributed, without being first raised by artificial means. But Spot pond is 140 feet above the tide waters, and, consequently, its water may be brought to the highest land in the city, by an aqueduct, without any farther elevation. The water of both places is of good quality, holding no salts in solution, and having no substance mixed with it, from which it may not be easily separated before it is taken into the aqueduct.

The latter place is in Stoneham, about 8 miles from this city, and from a survey in

the office of the secretary of this commonwealth, it contains 220 acres.

There are two courses by which a pipe, which must necessarily be of iron, may be brought to Boston. One of these, is, to commence at the south end of the pond, about 80 rods east of the Andover turnpike, thence in a southerly direction following the low land to Mystick river which may be crossed near the ship-yard in Medford, and from thence, after crossing the Middlesex canal, keeping near the Cragie road from Medford to Cragie's bridge; thence across Charles river to the Boston shore.

The whole cost, therefore, of works sufficient to supply the city with water, if taken from Charles river, including the cost of reservoirs, in the city, and of distributing the water to the inhabitants, carrying the pipes through all the principal streets, but not into the several houses, making an aggregate length of pipe, of about 22 miles, will be \$514,842. If taken from Spot pond and brought over the Milldam, the cost will be \$615,469, and if brought from the same place by crossing Charles river near Cragie's bridge, the cost will be \$558,353. These amounts do not include, in any case, the cost of the right to draw the water from the sources specified.

I believe that the estimates are large enough to allow of such a thorough execution of the works, that the yearly cost of keeping them in repair will be of small amount."

While on the above subject it may not be uninteresting to peruse the following account of the means of supplying the city of Columbia (capitol of South Carolina) with water. It records an instance of individual enterprise, which we hope may be followed, if necessary, in a more Northern City.

"The Water Works of Columbia were begun in 1818, and finished in 1821. The water is collected from pure springs in a valley within the limits of the town, which is about ninety feet lower than the platform on which that beautiful place is built; these springs are conducted under ground to a reservoir in the centre of the valley, which is walled with granite and covered with a wooden roof; its capacity is 60,000 gallons. The springs now turned into it, fill it twice in twenty-four hours; and should the town require it, the supply may be doubled from other springs in the same valley, which are not now used. By means of a twelve horse steam engine, the water is forced into the summit reservoir, elevated 120 feet above the valley, and about 30 feet above the general level of the town. This reservoir holds 250,000 gallons; it is a circle ninety feet in diameter, and ten feet deep, enclosed with brick, and covered with a wooden dome. From it, the water is conducted into every part of the town; this requires about twelve

miles of metallick pipes, one half of which are cast iron for main, and the other half of lead, for service pipe; no wooden pipes have been used. The plans and execution of this work have been so perfect, that in seven years, during which time it has been in operation, the town has never been a day without water, and the repairs of the whole establishment have cost less than \$100 a year.

This work has been constructed by the funds of a single individual, and has cost about \$55,000."

PREMIUMS

FOR USEFUL INVENTIONS.

"On former occasions," says Mr. Cary in his address before the Massachusetts Charitable Mechanick Association, some years since "premiums have been awarded for new and useful inventions and for superior specimens of workmanship, and although the government of our Association, in their wisdom, have thought proper to discontinue them for the present, yet I trust the time is not far distant, when we shall find sufficient inducements to renew them, with more encouraging prospects of success." We had intended to prepare an article on this subject, believing in the great importance of it, when we met with the sentiments of the above author, whose views we take the liberty of transcribing. If their publication should elicit any thing further on the subject, whereby a feeling may be awakened which shall result in the establishment of measures for bringing out any one of the many, whose genius is now, we apprehend, lying dormant, and also of exciting our youth, (now that the evenings are long, and even work in the day is represented by many to be dull,) to spend some of their time in producing articles of skill, each in his profession in life, for the purpose of public exhibition, on the Anniversary of our Independence, for premiums, and for subsequent sale, our object would be fully attained, and we should know that the portion of room allotted to these remarks was not in vain. But to recur to the views of the respectable writer referred to.

"Genius, when devoted to useful purposes, should be honoured and encouraged, wherever it is found. This divine power, without which judgment is cold and knowledge is inert; that energy, which collects, combines, amplifies and animates," whether possessed by a poet, who, like Shakspeare or Milton, soars aloft into the regions of fancy and imagination, or like Newton or La-Place, penetrates into the

profoundest depths of philosophical and mechanical science, is entitled to receive the homage of our highest respect.

It was this, which inspired the immortal Archimedes, the father of mechanicks, when he produced those great inventions so useful to mankind, and which cast such a lustre on his name, and on the country which gave him birth.

It was this, which inspired the great Galileo, when bursting asunder the shackles imposed by the superstition of the age, his original and powerful mind demonstrated the superiority of true science and sound philosophy, over the dreams and dogmas of visionary theorists and ecclesiastical bigots.

It was this, which enabled the illustrious Franklin to draw from the clouds of Heaven the electric fire, and to make those other discoveries in philosophical and political science, which have placed him by the side of the first philosophers and politicians of his time.

It was this, which gave to Arkwright his fortune and his fame;—and enabled him to confer on his country one of the greatest benefits ever derived from human ingenuity.

It was this, which enabled Watt, and the no less celebrated Fulton, amid all those difficulties and discouragements which are usually attendant upon new experiments, to triumph over every obstacle, and to effect those astonishing improvements in the application of steam, which have proved of such incalculable advantage to the world.

Genius of the highest order, it is true, but few possess. Those superiour minds, which occasionally appear among us, to enlighten and improve the world, are rare; their visits are like those of angels, "few and far between:" but this consideration should not discourage the aspiring mind; much may be done by education, industry and perseverance.

"What cannot art and industry perform,
When science plans the progress of their toil!
They smile at penury, disease and storm;
And oceans from their mighty mounds recoil."

The inventive faculties of man, however, need a stimulus; a motive for exertion; and when this is presented, the happiest results may be anticipated. And so, also, is it with mechanical skill. Wherever a liberal patronage is extended to the arts, a much greater share of inventive, as well as practical talent is brought into operation; for what a boundless field does the science of mechanicks present for the exercise of human genius! What wonderful revolutions in the physical and moral world, have been produced by its agency!?

SPECULATIONS

ON THE EARLY AGES.

It has been remarked by men of old that every man is, in some degree, his own historian and his own chronologist.—Notwithstanding the voluminous productions over which we bend from infancy to manhood, and which we explore as the oracles of truth, placed in our hands by our natural guardians, and sanctioned in our estimation, by the most potent associations, there is a book of nature, a wisdom, which cries aloud at the corners of the streets, which we read before we are aware, and to which we hearken without bidding. What man is there who cannot discover in his own mind a regular system of opinions, for the origin of which neither his memory nor his imagination can account? Who cannot discern, in his own intellect, fabricks of thought which have reared themselves up from foundations laid before the records of his memory, and structures of opinion which seem to be coeval with his existence, and to owe their origin to a power that his vigilance has never been able to detect?

Reading history is like travelling through a country. We pass on rapidly from post to post, we examine the great curiosities which every one has examined before us, and pause to wonder at the signal monuments of some remarkable defeat or wondrous discovery: and then we return home to tell our friends all that we have seen and to exult in the idea that we too have trod the classic ground, and are entitled to be numbered among the lucky few who have seen what is so attractively described.—But when we come to examine ourselves respecting the character, feelings, domestick qualities and habits of the people, among whom we have been sojourning, we find that it was the exterior only of the treasure that we beheld, and that of all, that is really worth knowing, we remain yet in profound ignorance. We feel that we have traced but one faint line upon the map, and that the surface, in its whole length and infinite expanse, is unexplored. History is but the outline of what has taken place, we may study it till we exhaust all its stores, and despite of its plenitude, we find ourselves unsatisfied; the filling up, the colouring, the striking lights and relieving shadows are all washed out by the besom of relentless and destroying time, and there remains to us solely the mutilated relics of what once was.

The ingenuity of the present age has

availed itself copiously of the blanks in the records of antiquity, and even of the occasional chasms in modern history, to issue with unsparing prodigality, a number of works of fiction so attractive and plausible that they threaten to usurp the places of the more authentick, but less fashionable, volumes; and (what is equally to be deprecated) tend to throw a shadow of fancy upon serious speculations.—The advocates of the present state of literature have, however, a defence for their system as plausible as their cause. They maintain that by adding interest to truth, they increase the number of those who pursue it, by many who, otherwise, would have neglected it altogether. Besides which, it puts us upon inquiry, teaches to receive with caution what is placed before us, and emboldens to originate and speculate for ourselves.

One of the most interesting inquiries that can engage the attention, and that least occupied by established and undeniable data, is the origin and progress of Mechanick Arts in the early ages of the world. The field is almost unoccupied.—History, in traversing the vast arena, seems to overleap ages; and time, from extreme remoteness, appears diminished in the same manner as a physical object; so that centuries appear like days, and periods of vast distance, are, to our feeble sight, classed together like simultaneous events.

The mind rejoices to find itself let loose upon this field, and out of the sparse data, and paucity of circumstances presented under the guise of truth, to imagine and fabricate for itself, a whole system. A system must have existed, but by whom prescribed, how matured, by what experience guided, by what prejudices swayed, by what necessities brought into operation, and by what inducements maintained, are questions sunk in irrecoverable oblivion.—Much less amid the confusion of events, and upon the pages where the pen of the historian hardly rested long enough to record the creation and the destruction of a world, can we detect the details of human practices, and the nature and variety of the instruments, which must have been constantly and familiarly used.

The vast and superior power of man in these early ages compared to that which he possesses at the present day, is, in some degree attested by the mighty ruins upon which time has in vain inflicted its unwearied engines; but the whole extent of his power is exhibited only to the reflecting

mind in guiding itself through the regions of conjecture. by the rare and faint traces of fable or tradition.

We have, in the first place, no knowledge of the usual age of man in the first centuries. We know Methuselah's age, but are not sure that he was the oldest man in the world when he died; and we probably have but a limited idea of the rapidity of increase in the human race, until we reason upon the great age to which they arrived, and take into consideration the plurality of wives which was allowed by their laws.

As an instance of the monstrous conclusions, which seem naturally to follow the above data, we will suggest, that in accordance with them, a person in the first centuries of an age, corresponding to ten years in our times, might easily find himself the ancestor of a million of descendants! allowing him a number of wives, not unusual among eastern nations, it is not extravagant to suppose him the father of ten children at the actual age of twenty years, and we have only to suppose his offspring equally prolific as himself, and set the usual term of life at about eight hundred and forty years, and we find ample foundation for our suggestion. I do not, of course Mr. Editor, mean to assert these as serious truths, or as probabilities that I should rancorously maintain, but I find, in contemplating these subjects, very reasonable grounds for according to our remote ancestors much more consideration than they generally obtain.

If we suppose this person to have been the brother of one, or if still further, we suppose him to be one of the descendants of an ancestor as prolific as himself, we have a million of millions of inhabitants in two hundred and forty years!

However extravagant these fancies may be, they indicate that there may have been strong and populous nations, in ages which are commonly regarded as animated by the life and actions of one small family.

If you should esteem these vagaries, as worthy a place in your Magazine, I shall be tempted to continue them in some future number.

FIRE ENGINES.

In the London Mechanicks Magazine, for September, there is an article on "Fire extinguishing machinery," also two other articles, somewhat connected with the same subject, which, on perusal we handed to an intelligent gentleman of our fire department for his opinion, whether there was any sugges-

tion contained in them, which were new, and which might be valuable to introduce into the present system of extinguishing fires in this city and neighbourhood. We are informed there is nothing, but on the contrary, some deficiencies are pointed out in the London system, which do not exist here, and our readers will be astonished when we inform them that "the want of something like uniformity, in the connecting screws of the hose, if not in the size of the engines," are of these deficiencies! Now it is well known that the hose used in the whole fire department in this city can be connected by screws; nor is this all, the hose of the engines of Roxbury, Charlestown and Cambridge is all upon the same principle, being all of one calibre, and connects itself with the Boston hose, whereby the numberless advantages and the facility with which every contingency might be met under this arrangement, is all important. "A mode of elevating the hose and supporting it on ladders," is also recommended, "when playing into the upper part of a building;" this also, we understand, already exists with us.

We may hereafter revert to the subject, and furnish an account of our system of extinguishing fires, and shall be glad if we can furnish a few hints of improvement to our Trans-Atlantick friends.

COMMUNICATION.]

[FOR THE JOURNAL.]

ROADS IN THE COUNTRY.

The great improvement which has been made in the general condition of the roads must be a subject of observation to every one who has travelled much in New-England. The spirit of liberality which appears to have prevailed in many towns, does those towns much credit. I recollect a remark that was made to me by the late President Dwight, that he "always formed his opinion of the character of a town, when passing through it, by the appearance and behaviour of the children he met in the road; if they bowed or courtesied to him, he concluded they had a good bringing up, that they were of notable parents, and the general character of the place was in its favour." Just so, I would say of roads—I would judge of the character of a town by the *state of its roads*; and, putting the towns upon a trial of this nature, I should hope to lead those, who had began, to continue in the good work, and prompt those that were remiss, to set about a reform on the opening of the next season.

Labour, on the highways, has been performed, we apprehend, as low the past year as it has been for many years. In one town, in Massachusetts, a piece of road was let out by auction to be graded, (new made,) at 99 cts. per rod;—the same was again let out, under the purchaser, at 61 cts.—The taxes in some towns, for the making of new roads, have been very considerable; and a disposition has been manifested to do more thorough work by constructing stone bridges over streams, and by expending more than usual labour on the roads, thereby meeting an expense at once, which saves a continual annual tax, which in ten years has doubled the amount of expenditure which would have been requisite in the first instance. In the town of Fitchburgh I remember to have passed over a very good piece of road, and which does great credit to its inhabitants.

The cost of two stone bridges, constructed the last year in Fitchburgh, over the Nashua stream, was for one, \$700; the other \$1,100, including twenty rods of road, being on a good town road to Ashburnham, and the best piece of road in that section of the country; the length of this piece of road is six miles; it avoids a very steep hill, the rise being from Fitchburgh to Ashburnham about 600 feet. The publick spirit of some of our country towns have been subjects worthy of praise, and elicit remark—the tax of this road was, to the town of Fitchburgh alone, no less than \$6,000, and to the town of Westminster, \$1,300. The length of one bridge is 100 feet, that of the other 50 feet; there are 3 arches in each, which have the appearance of being very durable, and are somewhat more to be relied upon than the rickety bridges which still remain in some other parts of our country, and which are the cause of such frequent accidents.

Let it not be said by any one that if we construct rail roads we shall not have a use for other roads; this is not correct—there will, in a few years, be as much travel on many of the present roads, after the rail roads are in operation, as there is now; the increase of population and business will make it, and there will be more encouragement to keep our town and country roads in good repair; much of the heavy travelling being removed, the old roads will not be so much cut up, and the highway taxes will be less for keeping such roads in repair; and this is a desideratum in favour of rail roads, which I present for the consideration of my country brethren.

A TRAVELLER.

BALTIMORE AND OHIO RAIL ROAD.

We have before us the third Annual Report of the President and Directors, communicating to the Stockholders the present state of this great and important enterprise, whereby it appears that, notwithstanding the formidable difficulties presented on the first divisions of the road, and the consequent heavy expenditures, the road can be completed upon the plan proposed throughout the whole line, which is from the city of Baltimore to the Ohio river, at an expense not exceeding the original estimate of \$20,000 per mile.

A route for the road has been secured extending from Baltimore to the Potomack river, a distance of sixty-six miles, and a right of way voluntarily conceded for a considerable part of this distance, and may be continued on a line to the coal mines in Allegany county, which will exhibit a railroad of 180 miles with but one summit requiring stationary power, a result which has not been paralleled in any work of the kind, either in this country or in Europe. The bridges are all built of stone, that over Gwynn's falls is a single arch of 80 feet span, with an elevation of 58 feet to the top of the parapet, and 300 feet in length. The bridge across the Patapsco has two arches of 55 feet span, each, and two of 20 feet span, each, it rises 46 feet high, and is 375 feet long, there are a number of other bridges. The excavations and embankments have unavoidably been very great; the deepest cut will be 79 feet, and the highest embankment is 57 feet. In one place the road has been carried through a solid mass of rock rising 58 feet above its surface. The cost of the next 41 miles is expected to be much less than the rate above named. After the completion of the work laid out for the present year, it is expected that 50 miles of the road may be constructed annually. The road, when completed to the Potomack only, will at once open to the city of Baltimore the trade of the fertile and extensive valleys of that noble river and its widely extended tributaries, and from that time cannot fail to become profitable, both to the stockholders and to the public.

The Commissioners who went out to England, and examined every rail road in Great Britain, returned with an expression of their entire conviction of the general efficacy of Rail Roads, as a speedy, certain and economical means of conveyance.

SILK,**ITS GROWTH AND MANUFACTURE.**

A very elaborate and valuable report on this subject was made to the last Congress, containing much useful information on this interesting item of public and internal improvement, accompanied by a number of plates for the better illustration of some parts of the machinery used in the manufacture of the article. The pamphlet contains 220 closely printed pages. We give an extract from the article on the history of silk in the United States, the cultivation of which first commenced in Virginia as early as the year 1623, next in Georgia in 1732, and in South Carolina in 1755, when Mrs. Pinckney, (the same lady who about ten years before had introduced the indigo plant into South Carolina,) took with her to England a quantity of excellent silk, which she had raised and spun in the vicinity of Charleston, S. C. The extract we give is of considerable length, but we believe its interest will amply repay for its perusal. It will afford the reader another of the ten thousand proofs of the constant desire of that great benefactor, Franklin, to seize with avidity every opportunity to promote the good of his beloved country.

"In the year 1771, the cultivation of silk began in Pennsylvania and New-Jersey, and continued with spirit for several years. The subject had been frequently mentioned in the American Philosophical Society, as one of those useful designs which it was proper for them to promote; but they were induced to enter into a final resolution on it, in consequence of a letter being laid before them on the 5th January, 1770, from Doctor Franklin, who was then in London as Agent of the Colony, and in answer to one which had been written to him on the same subject by the late Doctor Cadwallader Evans. In this letter, from Doctor Franklin, he recommended the culture of silk to his countrymen, and advised the establishment of a public filature in Philadelphia, for winding the cocoons. He also sent to the Society a copy of the work by the Abbe Sauvage, on the rearing of silk worms. A committee having been appointed by the Society to frame a plan for promoting the culture of silk, and to prepare an address to the Legislature, praying for public encouragement of the design, they proposed to raise a fund, by subscription, for the purchase of cocoons, to establish a filature, and to offer for public sale all the silk purchased and wound off at the filature; the produce thereof to be duly accounted for, and to remain in the stock for carrying on the design. A subscription, among the citizens, was immediately set on

foot, and the sum of £875 14s. obtained the first year; eggs and white mulberry trees were imported, and a digest of instructions composed, published, and distributed. Until the white mulberry trees were fit to allow of their leaves being plucked, the worms were fed upon the leaves from the native trees, and were found to agree perfectly well with them, and to yield excellent silk. It is believed that all the silk produced during the continuance of the Society, was from food furnished by native trees. A spirit for the silk culture was excited among the citizens, and many garments are still possessed by families which were made from silk raised by their forefathers. The war of the Revolution put an end to the patriotick association, and suspended, in a great measure, the silk culture—there being no longer a sale for cocoons; but many persons continued their attention to it, and others resumed it after the termination of the war.

The knowledge of the proper mode of rearing silk worms, and of winding the silk, was greatly promoted by the publication of a paper on those subjects, in the 2d volume of Transactions of the American Philosophical Society of Philadelphia, which the late Doctor John Morgan procured from Italy, through a silk mercantile house in London.

During the last three years, a spirit has been revived and diffused on the subject, and promises to increase; and there can be no hesitation in saying, that a ready sale for cocoons is alone wanting, to establish the silk culture as a regular employment in several states of the Union. It was the want of this market which defeated, in a great degree, the patriotick attempt of Mr. Nathaniel Aspinwall, of Connecticut, about the year 1790, to revive the silk culture in Pennsylvania, New-York, and New-Jersey. But his memory deserves to be held in everlasting and grateful remembrance, for the thousands of white mulberry trees which he planted in those states, and for the commendable zeal he exhibited in the cause.

In Connecticut, attention to the culture of silk commenced about the year 1760, by the introduction of the white mulberry tree, and eggs of the silk worms, into the county of Windham, and town of Mansfield, from Long-Island, New-York, by Mr. N. Aspinwall, who had there planted a large nursery. He also planted an extensive nursery of the trees in New-Haven, and was active in obtaining of the Legislature of Connecticut, an act granting a bounty for planting trees; a measure in which he was warmly supported by the patriotick and learned Dr. Ezra Styles. The premium was ten shillings for every hundred trees which should be planted and preserved in a thrifty condition, for three years; and three pence per ounce for all raw silk, which the owners of trees should produce from cocoons of their own

raising within the state. After the publick encouragement for raising trees was found unnecessary, a small bounty on raw silk, manufactured within the state, was continued some time longer. A statute continues in force, requiring sewing silk to consist of twenty threads, each two yards long.

It would be an act of injustice to omit noticing the generous encouragement to the cultivation of silk in the American Colonies, which was given by the patriotick Society, in London, for "the Promotion of Arts," &c. From the year 1755 to 1772, several hundred pounds sterling were paid to various persons in Georgia, South Carolina, and Connecticut, in consequence of premiums offered by the Society, for planting mulberry trees, and for cocoons and raw silk.

After the war of the Revolution, the business was renewed, and gradually extended; and it is recorded, that, in the year 1789, two hundred pounds weight of raw silk were made in the single town of Mansfield, in Windham, Connecticut. In the year 1810, the value of the sewing silk and raw silk, made in the three counties of New-London, Windham, and Tolland, was estimated, by the United States Marshal, at \$28,503; but the value of the domestick fabricks made from the refuse silk, and worn in those counties, was not taken into consideration. They may be fairly estimated at half of the above sum. In the year 1823, inquiries were made by the writer, in Windham county, as to the increased attention to the silk culture there, and it was found that the value of the silk, and of the domestick fabricks manufactured in that county, was double that of the year 1810. It was also found, that sewing silk was part of the circulating medium, and that it was readily exchanged at the stores for other articles, upon terms which were satisfactory to both parties, and that the balance of the account, when in favour of the seller, was paid in silver. The only machines for making the sewing silk, are the common domestick small and large wheels, but practice supplies the defects of these imperfect implements; with better machinery, sewing silk of a superiour quality would be made. At present, "three-fourths of the families in Mansfield are engaged in raising silk, and make, annually, from 5 to 10, 20, and 50 pounds in a family, and one or two have made, each, 100 pounds in a season. It is believed that there are annually made in Mansfield, and the vicinity, from three to four tons."

The farmers consider the amount received for their sewing silk as so much clear gain, as the business does not interfere with the regular farm work of the men, or the domestick duties of the females, upon whom, with the aged and youthful members of the family, the care of the worms, and the making of the sewing silk chiefly devolves. It is known, also, that, in the other New-

England states, Maine excepted, more or less attention to the silk culture is given.

During the late war with England, Samuel Chidsey, of Cayuga county, New-York, sold sewing silk to the amount of \$600 a year, Mr. C. introduced the white mulberry tree in the town of Scipio, on its first settlement. Silk was, also, formerly raised by the French inhabitants, in the country now the state of Illinois, but to what extent is not known.

The cultivation of silk has commenced in the states of Ohio and Kentucky, and there is every reason to believe that it will extend. The first mentioned state contains a great number of citizens who formerly resided in the silk-growing districts of Connecticut and Massachusetts, and who will doubtless see their interest in renewing a branch of business, from which they formerly derived so much profit. In the latter state, it is chiefly confined to those industrious people, the United Brethren, whose steady, persevering labours and intelligence are the surest guarantees of success."

COMMUNICATION.]

[FOR THE JOURNAL.

FOREIGN IMPORTATIONS.

We need not inform the Importing Merchants of Boston, that this branch of business, from some cause or other, has greatly diminished. It is a serious, and an alarming fact, which they know to their cost. We are informed by a gentleman on whom we can depend, that a merchant, who had been in the habit of purchasing and shipping goods, from France to the United States, on an average to the amount of three millions of francs annually, from the year 1802 to the year 1824, commenced the first year by shipping the whole to Boston, but gradually diminishing these shipments, sent a part of his goods to New-York: so that in 1808, he sent to Boston and Salem 2,500,000 francs, and to New-York 500,000; in 1812, 2,000,000 francs to Boston, and 1,000,000 francs to New-York; in 1816, 1,500,000 francs to the former place, and the same to the latter; in 1820, 1,000,000 francs to Boston, and 2,000,000 to New-York, and, finally, in 1824, 3,000,000 francs to New-York, and none to Boston or Salem!

Since that time, our French goods come principally by the way of New-York. We understand that there are large importations from England and other places, also, by the way of New-York. The last line of Liverpool packets was established to remedy this evil, in part; but we apprehend that the remedy, if any, has been very imperfect. In fact we believe, that the remedy was not to be found in ships. We

have always been the cheapest carriers of the union.—It was a market that was wanting, especially for those heavy articles, crates of crockery, hardware, salt, &c., which would not bear a costly land carriage. Our market to the west, has been gradually diminishing for several years past, because other states have acquired facilities of internal commerce, superiour to ours. The consumers of the cheap, and heavy, articles mentioned, were also consumers of light and more costly goods, and it became convenient for them to take both articles from the same places; so that even the light goods which could bear the transportation, are no longer sought after here by our old customers.

We are told by the doctors, (we mean the honest ones,) that there is one great difficulty in the practice of physick; that is, to understand well the nature and origin of the malady; it is apparent, that any prescription, without this previous knowledge, may be death to the patient. It is for this reason that we prefer the French practice in medicine, which is called the *expectant system*. Now if we have waited long enough to understand the character of our commercial pathology, our political doctors may with safety begin the curative process. We think that we can remember the time, when Massachusetts had the best roads on this continent, and some other advantages, which enabled her merchants to import, and distribute through the country, north, south, and west, goods of every description, on better terms than any other sea-port. The interior of this state, and the neighbouring states which we supplied, were more populous and thriving than other states, which now rival us; we had, of course, more, and better customers, and could import largely, and thereby gain those advantages which large speculations have over small ones. Now it appears that circumstances are changed; other states have increased their population, their internal wealth and resources, by the means of internal improvements, and steam navigation; and our roads, formerly the best means of inter-communication, are no longer so. Other sea-ports, stimulated by the increased market in their own territory, have taken the lead in importation, have gained the advantages which appertain to a brisk and extended trade, one of which is, to content themselves with a smaller profit, and thus have trenched deeply on the market which formerly belonged to us almost exclu-

sively. These appear to us, to be some of the principal causes of the decline of which we complain; and we know of no remedy, but in the increased wealth and population of the customers which yet remain to us; all our efforts therefore should be directed to this object. No one can dispute us, as yet, that portion of the market eastward, which is approachable by water; and if we fail to open a communication to the west, which will enable our capitalists to invest their money there, and induce our young men to stay at home, and improve the numerous, and various resources, which yet remain unexplored in the interior of our state, then we must look for a market in the state of Maine, open new water courses, and construct cheap rail ways there, import for that market, and take our supplies thence. We already import hay, potatoes, cider, apples, lime, marble, and many other articles; coal will soon be found there, as it probably would to the westward, in the course of the excavations which the rail ways would have occasioned if they were adopted. We must, in such case, give up our western counties to New-York, and Connecticut, as certain gentlemen seem to wish. We may be also, obliged to give up some counties, not so far west, to Rhode Island.

Let us not despair, however, of the wisdom of our Legislature, nor doubt, that if the true cause of depression be found, that the remedy will be soon applied and a cure effected.

HYPOCRATES.

PRESSURE OF THE SEA

AT CONSIDERABLE DEPTHS.

The following experiments on the pressure of the sea were made by Jacob Green, M. D., Professor of Chemistry, in Jefferson Medical College, Philadelphia. They are of considerable interest, we therefore, present them to our readers.

"Among the various expedients resorted to, for the purpose of relieving the tedium and monotony of a sea-voyage, no one is more common during a calm, than to attach to a long line (the log) an empty bottle, well corked, and then to sink it many fathoms in the sea. In all such experiments it is well known, that the bottles, upon being drawn up, are either full, or are partially filled with water. The manner in which the water gets into the bottle, is, in some instances, perfectly obvious, but in others very perplexing, if not wholly inexplicable. Sometimes the cork, however well secured and sealed,

is driven into the bottle; and, when drawn up, the vessel is, of course, found filled with water; and in such cases, what is a little surprizing, the cork is often found occupying its original position in the neck of the vessel, being forced there, no doubt, by the expansion of the dense sea water, on being drawn near the surface. This seems to be proved by the cork being often in an inverted position. In the above experiment, and in some others to be mentioned presently, the bottle appears to be filled instantly; as the person who lowers the bottle, often feels a sudden increase of weight, somewhat similar to the sensation produced, when a fish takes the hook on a dipsey line.

Sometimes the above experiment is varied, by filling a vessel with fresh water, which, on examination, is found to be replaced by salt water; the cork remaining, apparently, undisturbed.

Sometimes, when the previously empty bottle is only half full of water, this, when poured into a tumbler, effervesces like water highly charged with carbonic acid gas. This is readily explained: for when the bottle descends, it is full of air, and when the water enters, it will, of course, absorb the air; especially when the dense water itself expands as it is drawn towards the surface.

Sometimes the experiment is performed by first corking the bottle tight, and then tying over the cork a number of layers of linen dipped in a warm mixture of tar and wax; in fact, every device seems to have been tried to prevent the entrance of the water by the cork. In many of these cases, when the bottle is drawn up from a depth of 200 or 300 fathoms, it is found filled, or nearly filled with water, the cork sound, and in its first situation, and the wax and tar unbroken. Two experiments are mentioned, in which vessels with air tight glass stoppers were used. In one case, the bottle was broken, and in the other, some drops of water were found in it.

How does the water find its way into the bottles? There are two opinions: one is, that it passes through the cork and all its coverings, in consequence of the vast pressure of superincumbent water, in the same manner as blocks of wood are penetrated by mercury, in the pneumatick experiment of the mercurial shower. The other, and less popular opinion, is, that the water is forced through the pores of the glass.

The following experiment, which was made on the 7th of May, 1828, in latitude 48 +

longitude $24^{\circ} 34'$, will, perhaps, throw some light on this subject.—Mr. Charles Dixey, the obliging and intelligent master of the packet ship *Algonquin*, had a boat rowed off from the ship, to the distance of about half a mile, when the sea was almost perfectly calm. A hollow glass globe hermetically sealed, which had been previously prepared in Philadelphia, was then fastened to a line, and sunk, with a heavy mass of lead, to the depth of 230 fathoms, or 1380 feet. On the same line, and 30 fathoms above the glass globe, was fastened a small bottle with an air-tight glass stopper. Fifty fathoms above this, a stout glass bottle with a long neck, was tied; a good cork was previously driven into the mouth of this bottle, which was then sealed over with pitch, and a piece of linen dipped in melted pitch, was placed over this; and when cool, another piece of linen treated in the same way, was fastened over the first. Twenty fathoms above this bottle, another was attached to the line, much stouter, and corked and sealed like the first, except that it had but one covering of pitched sail-cloth. Thirty fathoms above this, was a small thin bottle filled with fresh water, closely corked; and twenty fathoms from this last, there was a thin empty bottle corked tight and sealed, a sail-needle being passed through-and-through the cork, so as to project on either side of the neck.

Upon drawing in the line, thus furnished with its vessels, and which appeared to have sunk in a perpendicular direction, the following was the result:

The empty bottle, with the sail-needle through the cork, and which came up the first, was about half full of water, and the cork, and sealing, as perfect as when it first entered the sea.

The cork of the second bottle, which had been previously filled with fresh water, was loosened, and a little raised, and the water was brackish.

The third bottle, which was sealed and covered with a single piece of sail-cloth, came up empty, and in all respects as it descended.

The fourth bottle, with a long neck, and the cork of which was secured with two layers of linen, was crushed to pieces, all except that part of the neck round which the line was tied; the neck of the bottle, both above and below the place where the line was fastened, had disappeared, and the intermediate portion remained embraced by the line. This I thought a little remarkable;

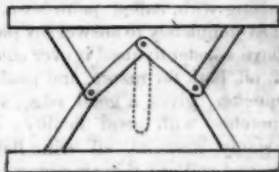
but, perhaps, it may be explained by supposing that the bottle was first filled, by the superincumbent pressure, with dense sea-water, which expanded on being drawn up near the surface. Had the vessel been broken by external pressure, that part surrounded with the line, ought to have been crushed with the rest.

The fifth bottle, which had been made for the purpose of containing French perfumery, or æther, and which was, therefore, furnished with a long close glass stopper, came up about one-fourth filled with water.

The hollow glass globe, hermetically sealed, which was the last, and had been sunk the deepest of all, was found perfectly empty, not having suffered the smallest change. It is, therefore, concluded, that at the depth of 230 fathoms, the water enters glass vessels through the stoppers and coverings which surround them, and not through the pores of the glass."—(Phil. Mag.)

POWER PRESS,

FOR PUNCHING COPPER, FOR SHIPS USE.



The above is a representation of a machine, for punching copper, or other metallic plates, invented by our worthy and enterprising townsman, Mr. George Darra-cott. The facility with which it operates, gives it a high rank among useful inventions. The machine punches, at once, all the holes required in a sheet of copper, or other metal. A strong frame of wood is secured together by bolts and screws; the upper timber of this frame is about five feet long, fourteen inches wide, and six inches thick, the ends and bottom being of corresponding strength. Under this is a movable piece, or follower, which is capable of being raised, by means of the progressive levers, or toggle joints, which are placed below it; this follower is denominated the platen, and is about four feet seven inches long, thirteen inches wide, and six inches thick. These two timbers stand about four inches apart, and the space between them is occupied by two pieces of plank, each about two inches thick, and of the same length and width with the platen; in the upper one are fixed as many

punches as there are to be holes in the sheet, and in the lower one corresponding dies. A sheet of iron is placed between each plank, and its corresponding timber, in order to support the punches and dies. The power is obtained by an arrangement of progressive levers; the middle joint being forced down by a lever, causes the platen to rise, and the plate upon it to be perforated.

USE OF SOAP

FOR SETTING CUTTING INSTRUMENTS.

The following article is extracted from the Transactions of the London Philosophical Society; and communicated to them by George Reveley, Esq.; we give it a place in our columns in order that its merits (if such as represented) may benefit the publick.

"I beg to communicate to the Society of Arts, for the benefit of the publick, a new method of setting razors, by substituting soap instead of oil. Not having any oil to set my razor, it occurred to me to try the soap I was washing with, called palm soap, and I found it so completely to answer my purpose, that I have constantly used it ever since, instead of oil, both for razors and penknives. It sets quicker, gives a good edge, and removes notches with great facility; it is a more cleanly material, oil being liable to drop on and soil any thing it comes in contact with; dust will frequently get into oil, which will spoil the edge, and in such case it must be changed. It is as cheap or cheaper than oil; a small square of palm-soap costing only three-pence, which will last for a great length of time. The operation is performed as follows: having first cleaned your hone, with a sponge, soap, and water, wipe it dry, then dip the soap in some clean soft water, and wetting also the hone, rub the square of soap lightly over it, until the surface is thinly covered all over; then proceed to set in the usual way, keeping the soap sufficiently moist, and adding, from time to time, a little more soap and water, if it should be necessary. Observe the soap is clean and free from dust, before you rub it on the hone; if it should not be so, it is easily washed clean; strap the razor, after setting, and also again when you put it by, and sponge the hone when you have done with it.

I herewith send certificates respecting my method of setting razors, which also includes workmen's tools; the fact thereby established of setting quicker, is important,

as one fourth in time gained by those who are employed in setting a considerable number of razors, &c. is an object both as to convenience and in saving expense; the excellent state in which it keeps the hone, is also an object, both in respect to cleanliness, and the advantage of its surface being kept in a better state for action than when oil is used. With respect to novelty, I only can say I never heard of any one having used it, or received any information from any one on the subject of setting with soap, previously to my making the communication to the Society, nor can I learn, on inquiry, that it is known to the publick.

In addition to the preceding certificates, it is only necessary to state, that both Mr. West and Mr. Pepys made trial of Mr. Reveley's method, in presence of the committee, and to their entire satisfaction.

The saving, in point of time, observed by all who have made comparative trials of oil and soap, will, probably, be accounted for from the following considerations: if a blade of steel is drawn along a dry hone, certain parts of the hone will be found to be covered by a thin film of steel, abraded from the blade, and now adhering so firmly to the hone as to prevent its action in the parts thus covered. Having removed the film of steel by means of a pumice-stone, and dropping a little oil on the surface of the hone, it will now be found that the abraded particles of steel are suspended in the oil, which thus becomes discoloured, while the whole surface of the hone continues to act on the edge, except where, from the irregularities of the stone, or the oblique position of the blade, a thin stratum of oil happens to be interposed. In this case, the tenacity of the oil preventing it from yielding readily to pressure, the blade is apt to slide a considerable distance before it again comes in contact with the surface of the stone. The tenacity of soap and water is by no means equal to that of oil, though capable of holding the abraded particles of steel suspended in it; hence the quantity of effective cutting surface of the hone, is increased."

PUBLICK SEWERS.

There is an article on this subject in the London Mechanicks Magazine, for September, announcing a recent improvement in their construction, which has recently been adopted in St. James Park, and which the Editors conceive to possess several important advantages. It was suggested, it is said, by a Mr. Cuff, of Ebenezer-terrace,

London Hospital, who had previously succeeded in introducing it in several places in his own neighbourhood.

To enable its readers to understand in what the merits of this new plan consists, the Magazine contains an engraving of the old sewers, and then furnishes an engraving of the improved sewer. It also describes the evils of the old establishment and the "enormous" expense arising from the former injudicious mode of constructing them. Of the new sewers, the article goes on to state:

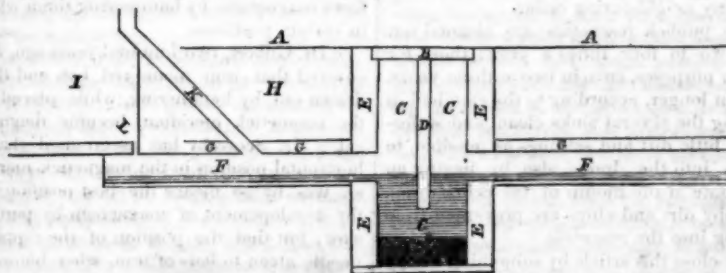
"The advantages of this mode of construction will be at once perceived. In the first place, all the ponderous matters fall to the bottom of the well, and are detained there out of the way of the discharging sewers, till they are removed, (which it is proposed to do once a month,) by a rake. Secondly, this deposit is always covered with water to a sufficient depth to prevent its giving forth any noxious odours, precisely as the "stink trap" commonly used in the sinks and drains of private houses, protects them from the like nuisance. Thirdly, the supernatant water, as often as it rises to the level of the branch sewer, passes off into the main sewer, and is thus in a state of constant change. Fourthly, it is water only, though doubtless water in a state of great impurity, which is conveyed through the main sewer into the Thames; so that were all the sewers constructed on this plan, there would not be a tenth part so much filth discharged into the river as heretofore, and the objections which have, on account of that filth, been made to the

river water, as a source of supply for domestic purposes, would be almost entirely obviated.

We make no doubt whatever that an improvement of such great and manifest utility as this, which is, withal, extremely simple, and cannot be expensive, will be forthwith universally adopted; not in the metropolis alone, but in every well regulated city and town, to which a knowledge of it may extend."

Before our Boston readers finish perusing the article, they will anticipate us in announcing the fact that *this very improvement*, here referred to, has been used in Boston, for public purposes for many years, and in the yards, &c. of our dwelling houses, 25 or 30 years!

We subjoin an engraving of that in use here, uniting the city street sewer, and well, (or as it is termed here *Sess-pool*,) with that used for private purposes. We do this not in any vain boasting, for we hope to give evidence hereafter to the contrary, but we do really think that notwithstanding the disparity which exists in the time of settlement of the great metropolis of England, with that of the metropolis of New-England, and that the advance of the march of improvement would be considered as being with the former, still, that we have in Boston, very many similar instances, connected with city police, and private convenience, with that which makes the subject of this article, which they know nothing of in London.



A Surface of earth, or street.

B Opening, topped with timber, or curb stone, and covered with plank.

C Sess-pool, well, or reservoir.

D Partition of plank, or brick walls; if brick to be supported by an iron bar, and in both cases, to be made air tight.

E Sides, laid up in brick and mortar, or if to be used in a yard, or for other private purposes, may be made of plank.

F Sewer.

G Covering of the sewer, in slate.

H Earth.

I Cellar.

K Private drain from sink or wash room, or for supplies of rain water from cistern, pump and sink.

L Outlet of cellar drain.

Dark colour at bottom of well, represents the settlements or sediment dropped from the drain or sewer. The cost of a Sess-pool, or well, in, on the above plan, (if constructed of plank,) for a yard, from \$7 to \$10;

If of brick, and of course more durable, \$15;

If for publick purposes, (always laid with brick, or stone,) from \$70 to \$100.

There has recently been introduced a copper or cast iron Sess-pool, as it is called, from 6 to 8 inches square, and is let into the sink spout at the top, and lays flush with the bottom of the sink, and which so effectually keeps out any disagreeable smell from the drain and main sewer, as in some measure to supersede the use of those described as above; the cost is only \$1, if of cast-iron, and are to be found at all our hardware stores; those of copper are, of course, more expensive, but the nature of the metal, admitting of their being kept constantly bright, would be a cause for preference with many whose neatness always keeps every part of their premises clean.

The Sess-pool, as laid in our publick streets, is without any partition, and is used for the single, but highly important purpose, of receiving the mud, &c. which would otherwise collect in the sewers, and render it necessary to break up the pavement, open the earth, and sewer, and clean it out at, (as the London Magazine observes,) "an enormous expense," and trouble. The Sess-pool used in our yards, and for other private purposes, is constructed after the manner of the foregoing representation, and while the former answers but one purpose, this answers three very important ones: viz. that of a place of deposit for the filth; that of preventing the admission into the cellar and house, any noxious smell from the dock, when the tide is out, or from the sewer itself; and also that of preventing rats from passing up the sewer from the dock, or from any neighbouring cellar.

The publick reservoirs are cleaned out from two to four times a year; those for private purposes, once in two or three years, or even longer, according to the care had in keeping the several sinks clean, and suffering as little dirt and settleings as possible, to escape into the drains, also by having an iron grate at the mouth of the cellar drain, whereby dirt and chips are prevented from passing into the reservoir.

We close this article by subjoining a copy of a note addressed to the late mayor of Boston, in June, 1823, from one of the then superintendents of streets, and who, we believe, introduced the drain and Sess-pool there described.

Boston, June, 1823.

To the Mayor and Aldermen of the city of Boston, and the Surveyors of the Highways.

At the request of the mayor, I give my plan and views in respect to all common Sewers and Sess-pools to be built in the city hereafter.

1st. All common Sewers in the publick streets, should be the property of the city, and each individual be taxed his or her proportion of the expense, as they may be benefitted by the same.

2d. They should be built of a cylinder form, where the ground would allow it, and the bottom, or lower half to be laid in Roman cement and parged with the same; the upper half to be laid in good lime mortar, the bricks to be hard and made to a mould, thickest on the outer edge; in the principal streets, they should be not less than 22 inches diameter in the clear.

3d. There should be a Sess-pool, built at the angles and crossings of other streets, of stone, 4 feet by 2 in the clear; to be sunk 2 feet below the bottom of the common Sewer; to be raised and capped with curb stone, (grooved to receive a three inch oak plank,) even with the paving; the plank to be taken up twice a year and the Sess-pool cleared of what might fall from the drain.

The advantages of a circular drain over a flat one are very great; first, the flat ones are not tight on either side; the dirt gradually works through the joints of the bricks and slate, and ledges on the flat bottom, thereby very often filling up the drain. The circular one is made water tight, and being so constructed that the water, running in the centre, carries the dirt to the Sess-pool. A mottle of the circular drain will be found in the attic story of the Court House.

EPHRAIM MARSH.

MAGNETISM.

Our readers will find some interesting results in the following experiments on the magnetick power of iron and steel, and the method of freeing those substances entirely from magnetism, by hammering them while in certain positions.

"Dr. Gilbert, two hundred years ago, discovered that iron made red hot, and then drawn out by hammering, while placed in the magnetick meridian, became magnetical. Mr. Scoresby has ascertained that a horizontal position in the magnetick meridian was by no means the best position for the development of magnetism by percussion; but that the position of the dipping-needle given to bars of iron, when hammered, produced the highest effect. A single blow with a hammer on a bar of soft iron, held vertically, was found to be capable of giving it a strong magnetick action on the compass, the upper end becoming a south pole, and the lower end a north pole; on inverting the bar, another blow was found sufficient to change the polarity formerly given to it. But one of the most important effects of percussion, observed by Mr. Scoresby, was found to be this, that a blow struck

upon any part of a bar of iron, while held in the plane of the magnetick equator (which is horizontal E. and W., or with the north end elevated about 19 degrees above the horizontal line in this country,) has an invariable tendency to destroy its magnetick action, which it generally does so effectually as to prevent its exerting any influence over a compass, when presented to it in the same plane of the magnetick equator.

Previously, no other method was known of freeing iron or steel completely from magnetism, but that of heating it red hot, and allowing it to cool in a horizontal position, east and west. This process, however, besides spoiling the surface of the metal, is troublesome, and seldom completely effectual in its application. But the same object is accomplished in a moment, and with infinitely better effect, by Mr. Scoresby's process, merely by a slight blow or two with a hammer while the iron or steel is held in the magnetick plane, and is equally applicable to very large and heavy bars. Grinding, filing, polishing, drilling, turning, twisting, bending, &c. were all found to elicit magnetick attraction, when performed in a vertical position, or any position out of the magnetick plane; but the same processes, were destructive of polarity, when performed on a bar or plate of untempered metal, while held in the plane of the magnetick equator. Hence, the magnetism of steel chronometer balances would, no doubt, be prevented, and even destroyed, if they had previously obtained it, by turning them into form, and polishing them in the plane of the magnetick equator.

Mr. Scoresby found that soft steel received the greatest degree of magnetick energy by percussion. In soft iron, the magnetism was strong, but evanescent; in hard steel and cast iron, weak, but permanent. Magnetism in steel being more readily developed by the contact of magnetizable substances, and particularly if these substances be already magnetick, it was found that the magnetizing effects of percussion were greatly increased, by hammering the steel bar with its lower end resting on the upper end of a large rod of iron or soft steel, both the masses being held in a vertical position, and especially if the rod was first rendered magnetick by hammering. Mr. Scoresby found that small or slender bars acquired a much greater lifting power, in proportion to their weight, than large bars. There was an increase of attraction in bars of the same diameters, when the lengths were increased.

The quantity of magnetism developed by this process, was increased by a frequent repetition of the experiment with the same bars.

Mr. Scoresby being desirous of applying the process to the construction of powerful artificial magnets, prepared six bars of soft steel, and bars properly tempered, suitable for a large compound magnet. The soft steel bars were nearly eight inches long, half an inch broad, and a sixth of an inch thick. The bars for the compound magnet, seven in number, which were of the horse-shoe form, were each two feet long before they were curved, and eleven inches from the crown to the end; when finished, one inch broad and three eighths thick. These bars were combined by three pins passing through the whole and screwing to the last; and any number of them could be united into one magnet, by means of a spare set of pins screwed throughout their length, and furnished with nuts. In addition to these bars, &c. he provided separate feeders, or conductors, of soft iron, suitable for connecting the poles of each of the bars of the compound magnet, and also another conductor fitted to the whole when combined. To communicate the magnetick virtue, a rod of soft steel was hammered for a minute or two, while held vertically upon a large bar of soft iron in the same position; this gave considerable magnetism to the steel rod. Every one of the six bars of soft steel was then hammered on the top of this steel rod, until the accession of lifting power ceased. Then fixing two of them on a board, with their different poles opposite, and formed by a feeder at each end into a parallelogram, these were rubbed after the manner of Canton, by means of the other four bars, and thus their magnetism was greatly augmented. The other four bars were operated upon in pairs, in a similar way, those already strengthened being used for strengthening the others, and each pair being successively changed, until all the bars were found to be magnetized to saturation. A pair of them now possessed a lifting power of two pounds and a half.

The next step was to touch the bars intended for the compound magnet, by means of these six bars now magnetized. For this purpose the six bars were combined into two magnets, by tying three of them together with similar poles in contact; these two were then placed with opposite poles in connexion, and tied together at one end, but separated about the third of an inch at the

other, so as to form one compound magnet, and a conductor was kept constantly applied to the open end of it when not in use, to preserve the power from being lost. One of the bars of the horse-shoe magnet, with a conductor placed across the poles, was now placed on a board, in a groove cut out so as to hold it fast under the operation. The straight bar magnet was then placed erect on the middle of it, with the separated poles downward, and rubbed against the horse-shoe bar from the middle to one of its poles, until the north pole of the one was in connexion with the pole intended to become south of the other; from thence it was rubbed back again, with the south pole of the magnet in advance, as far as the other extremity, or that intended for the north pole of the horse-shoe bar.—Two or three strokes of this kind being made from end to end of the bar, on each side of it, the south and north poles of the magnet being always directed to the south and north poles of the bar respectively, the magnet was slipped sideways off when at the pole of the bar, and the bar was found to have acquired such a magnetic power as to enable it to sustain a weight of several ounces hung from the conductor. Each of the bars of the horse-shoe magnet was treated this way in succession, and then the first five bars of the magnet being combined by the screws, were employed in the same way as the soft steel magnet had been used, for increasing the power of the sixth and seventh bars, by which they were rendered capable of carrying above two pounds weight each. These were then substituted in the combined magnet, for the fourth and fifth bars, while the latter underwent the touch of the other five in combination, and in their turn, the second and third, and then the seventh and first, were subjected to similar treatment. After these operations, which occupied 43 minutes, the compound magnet, with all the seven bars in connexion, lifted ten pounds; after a second series of the same kind of manipulations, five of the bars in combination carried fifteen pounds; and after a third series, eighteen pounds; but as, on trying a fifth series, little augmentation took place, the process was discontinued. The whole of the operations, from beginning to end, occupied above four hours; but as each bar was generally rubbed with twelve strokes on each side, instead of one or two, which were afterwards found to be sufficient, and in other parts of the process a great deal of time and labour were spent,

which turned to no account; no doubt but the whole might have been completed, beginning without the smallest perceptible magnetism, and ending with a lifting power of twenty or thirty pounds, in the space of two hours or less. As steel does not receive, immediately on being touched, the full degree of magnetic energy of which it is susceptible, a conductor was applied to the magnet now formed, and it was laid aside, with the view of augmenting its power on a subsequent occasion. (Repository of Arts.)

FROM ENGLISH PAPERS.

STEAM ENGINES, AND CARRIAGES.

“Whether the caricatures which represent a steam engine as flying like a balloon through the air, shall ever become any thing more than a caricature may be doubted; but such have been the achievements of science and art within the last three quarters of a century, that it is really difficult to fix any limits to their future conquests. To justify us in pronouncing any thing impossible in machines, it ought to be in opposition to some law of nature, and not merely requiring an immense extent or difficult application of power. And so marvellous have been the inventions and discoveries in every branch of science, and in all the arts, since the beginning of the last reign, that, if they had been predicted in the year 1700, most men would have thought the prophecy deserved to rank with the Arabian story of the erection of Aladdin’s palace in a single night.

Since the invention of printing, the power of man to disseminate knowledge has been increased almost beyond calculation. Even within the last thirty years a prodigious augmentation has taken place in this power. Before the improvement of Earl Stanhope, from three or four hundred sheets might be printed per hour at the press; but the steam-press which now works the Times newspaper, prints four thousand sheets per hour, or more than a sheet per second! It may be easily proved, that to write by hand the number of newspapers circulated by the times, daily, would require a million and a half of scribes;—yet they are printed with ease by about two dozen men. Such is the effect of a skilful division of labour, that a debate of eight or ten hours duration in the House of Commons, may be fully and ably reported, printed, and published so as to be read in London within three or four hours after its termination, and at sixty miles distance from the metropolis, before the speakers of the previous night have risen from their beds.

Such are a few of the more striking inventions and improvements of modern times. Yet invention is not exhausted. These seem to be but the commencement of an endless series; and the late experiments of Locomotive Carriages on our rail way give us quite a new idea of what science and art may yet do to quicken the transport of travellers and goods through the land. Though the idea of moving a carriage by a mechanical power within it, is not absolutely new, yet it has never been successfully reduced to practice till our own day; animate power, applied either externally or internally, has always been used for purposes of locomotion. To place a steam engine on wheels,

and to make it move both itself and an additional weight, was a bold conception: the first essays were clumsy and unpromising, and even up to the present time a machine has never been seen in operation which was calculated for the rapid conveyance either of passengers or commodities.

The performances of the Rocket and the Novelty give a sudden spur to our drowsy imaginations, and make our ideas fly as fast as the machines themselves. The engines with all their apparatus skim over the earth at more than double the speed of the lightest and fastest mail, drawn by the swiftest blood horses, and driven by the most desperate coachman, over the smoothest roads in England.

On a well constructed rail-way, like that between Liverpool and Manchester, there is less danger in moving at the rate of thirty miles per hour than there is in travelling at the rate of ten miles per hour on a turnpike road. On the rail-way there is not a single turn, and scarcely a single inequality; in these respects the engineer has boldly and wisely aimed at perfection, though he thereby incurred what many deemed an extravagant expense. The chief sources of danger in travelling rapidly on turnpike roads are, 1st, hills; 2d, turnings in the roads; 3d, inequalities in the surface of the road; 4th, unruly horses; 5th, meeting other horses. Not one of these dangers exists on the rail way, and therefore it is difficult to limit the speed at which we may travel with safety.

LIST OF AMERICAN PATENTS

GRANTED IN AUGUST, 1829.

1. For improvements in the Preparation of Hemp and Flax for Spinning, consisting of instruments for dressing, or separating the hurl, in either a rotted or unrotted state, and shortening the hurl and fibre, in such a manner as to be drawn, roped, spun, and woven, the same as cotton or wool; La Fayette Tibbitts, New-Amherst county, Virginia, August 1.
2. For a Machine for Washing Clothes; Wm. E. Arnold, Hadam, Middlesex county, Connecticut, August 3.
3. For Avoiding the Dead Point in the Crank in the Steam Engine; Valentine Carter, Washington county, District of Columbia, August 3.
4. For a Thrashing Machine; Enoch A. Harman, Upper Marketfield, Bucks county, Pennsylvania, August 5.
5. For a machine for the purpose of Ditching, and Excavating Ground for Canals, or other purposes; George Henricks, Urbanna, Champaign county, Ohio, August 5.
6. For a Cooking Stove, called the Double Furnace Cooking Stove; Josiah Richards, Claremont, Sullivan county, New-Hampshire, August 5.
7. For a Machine for Breaking Flax, Hemp, and every kind of Textile Plant, rotted, or unrotted; J. L. F. Roumage, New-York, August 6.
8. For an improvement in the mode of Stiffening Hats; Jonathan D. Wilson, New-York, August 6.
9. For an improvement in the Use and Application of Steam; Timothy Packard and John E. Strong, Granville, Washington county, New-York, August 7.
10. For an improvement in Book-binding; Jesse Torry, Germantown, Philadelphia county, Pennsylvania, August 8.
11. For an improvement in the shears of a Cloth Shearing Machine; Samuel A. Britt, Cazenovia, Madison county, New-York, August 10th.

12. For a Cooking Furnace Gridiron; Jonathan Powers, Lansingburg, Rensselaer county, New-York, August 10.

13. For Preserving Apples and other fruit, Beets, and Sweet Potatoes, and other roots; Amos Hart, Wharton, Fayette county, Pennsylvania, August 10.

14. For a Compound Lever Press, for Pressing Cotton; Philenzo Payne, Claiborne county, Mississippi, August 10.

15. For Raising the Nap on Woollen Cloth; Zachariah Allen, Providence, Rhode Island, Aug. 10.

16. For a machine for scattering manure, called a Manuring Wagon; James Bowman, Beaufort, South Carolina, August 12.

17. For a Machine for Spinning Wool, for the use of families and manufacturing establishments; Warren Allen, New-Haven, Oswego county, New-York, August 15.

18. For an instrument for Sharpening Knives, and other cutting instruments made of iron, or steel, called "Dunn's Knifesharpener;" William J. Dunn, New-York, August 18.

19. For an improvement in the business of Ferrying and Draying; Lunenburg, C. Abernathy, Boone county, Kentucky, August 18.

20. For an improvement in the mode of Cutting Garments; Otis Madison, Troy, New-York, August 18.

21. For a Portable Trip Hammer; Samuel Kilburn, Sterling, Worcester county, Massachusetts, August 18.

22. For an improvement in the making or manufacturing of Blanks for Checks, or Drafts, or Bills of Exchange; James Atwater, New-Haven, Connecticut, August 18.

23. For an improvement in the Wheat Fan; George Hoffman, Frederick county, Maryland, August 21.

24. For preparing or Manufacturing Dye by Steam; Reuben Wood, Erin, Tioga county, New-York, August 25.

25. For an Air Furnace Oven Stove; Oliver Davison, Johnstown, Montgomery county, New-York, August 25.

26. For a machine for Packing Cotton; Obadiah Stith, Laurenceville, Brunswick county, Virginia, August 25.

27. For a machine for Raising Water by Atmospheric Pressure; Samuel McCune, Wilmington, Clinton county, Ohio, August 25.

28. For an improvement in Canal Boats; Thomas W. Bakewell, Cincinnati, Ohio, Aug. 25.

29. For an improvement in the Grist Mill; Job Wickersham and Thomas Crozier, Fairfield, Columbiana county, Ohio, August 25.

30. For manufacturing Felt for Cloth, Padding, Carpets, &c.; John Barker, Bridgewater, Oneida county, and Leonard Kinsley, Catskill, New-York, August 25.

GRANTED IN SEPTEMBER, 1829.

1. For an improvement in the construction and operation of the Printing Press, denominated "Booth's improved double Printing Press;" Jonas Booth, sen., James Booth, Thomas Booth, Jeremiah Booth, and Jonas Booth, Jun., New-York, Sept. 1.

2. For a Furnace Cooking Stove, which may be altered at pleasure into an open stove, similar to a Franklin fire-place, called the "Alterable Cooking and Franklin Stove;" George Richards, Providence, Rhode Island, September 9.

3. For an improvement in the Brick Pressing

Machine; John Woodson, Rockbridge county, Virginia, September 10.

4. For a new and improved construction of Vaults and Privies; Thomas Rundle, Boston, Massachusetts, September 10.

5. For an improvement in the mode of Covering Houses with Tin-plate, Sheet-iron, or Zinc; Richard S. Tilden, Lynchburg, Campbell county, Virginia, September 10.

6. For an improvement in the art of Manufacturing Sugar from Cane Juice; Ebenezer Avery Lester, Boston, Massachusetts, September 10.

7. For a Washing Machine, and for heating water for the same; Enos D. Cherry, Auburn, Cayuga county, New-York, September 10.

8. For a machine for Thrashing Wheat and other small Grain; James S. Wood, Patterson, Battetort county, Virginia, September 10.

9. For a machine for the purpose of Washing Alluvial Earth, Clay, and Soft Ores, and separating and saving the gold from the same; William H. Folger, Mechlenburg county, North Carolina, September 10.

10. For an improved Veneering Saw; A. F. Smith, Salem, Essex county, Massachusetts, September 10.

11. For an improved Auger, called the "Serpentine Screw Auger;" George Shetter, York county, Pennsylvania, September 10.

12. For a Washing Machine; George A. Stocking, Aurelius, Cayuga county, New-York, September 10.

13. For a Self-Adapting Rail-Way Carriage; James Wright, Columbia, Lancaster county, Pennsylvania, September 10.

14. For an improved Lamp; Isaiah Jennings, New-York, September 10.

15. For a Machine for Planing Timber, boards, plank, clapboards, window blinds, sash-stuff, cabinet work, tonguing and grooving, straightening the edges, and reducing to a thickness and width, all kinds of wood for various uses; called the "Improved Circular Planing Machine;" Uri Emmons, New-York, September 10.

16. For Making Paper from Straw; Louis Bomeisler, Philadelphia, Pennsylvania, September 10.

17. For an improvement in the art of Constructing and Building Lime Kilns, for the purpose of burning Lime; Louis Bomeisler, Philadelphia, Pennsylvania, September 10.

18. For an improvement in the Application of Machinery to the Inclined Plane, for Rail-Roads and Canals; Sands Olcott, Hursimus, Bergen county, New-Jersey, September 11.

19. For an improvement in the Plough; Thomas Brown, New-York, September 11.

20. For communicating motion to mills, and other works, by applying a Water Wheel to the current of a river, and for the machinery to effect the same; Joseph Wallace, Hartford, Ohio county, Kentucky, September 11.

21. For an improvement in the manner of Drawing Water through Forebays, to be discharged on water wheels; James P. Espy and Andrew Young, Philadelphia, September 11.

22. For cast-iron Copings, or Finishing for Chimneys, Fire Guards, Ridges, &c. of Buildings; Charles Neal, Waterford, Saratoga county, New-York, September 11.

23. For improved Iron Hubs for Carriages; Hercules Thomas, Middleborough, Plymouth county, Massachusetts, September 11.

24. For a Fly Net, for saddle, gig, or carriage

horses; Henry Korn, Philadelphia, September 12.

25. For an improvement in the Machine for Cutting Pannels for Carriages, and other Work, and Veneers, around, or off, the circular surface of a log; Job White and Phineas P. Quimby, Belfast, Waldo county, Maine, September 12.

26. For improvements in the common Water Pump; John Washington Hillias, Baltimore, Maryland, September 16.

27. For a machine for Planting, and Preparing Seeds for the same; Zebina Lane, Harrisburg, Lewis county, New-York, September 21.

28. For an improvement in the Manufacture of Harness Trimmings, and Carriage Ornaments; William S. Robinson, Taunton, Bristol county, Massachusetts, September 22.

29. For Manufacturing Perpetual Polished Water-Proof Boots and Shoes; John Ryan and John Haskins, of Boston, and Samuel Knowl, of Roxbury, Norfolk county, Massachusetts, September 23.

30. For an improvement in the Machinery for Bending Wagon Tire, hoops, bands, &c.; Josiah Butler, Cobleskill, Schoharie county, New-York, September 24.

We insert with pleasure as a curiosity, (we had almost said a novelty,) a drawing of the famous Fitch Steam-Boat, with a description extracted from the *Columbian Magazine*, for December, 1786. In the following March, the legislature of New-York granted to the inventor, and his descendants, the exclusive right of "making and employing and navigating all kinds of boats or water craft, which might be impelled through the water by force of fire or steam, in all the creeks, rivers and bays and waters, whatsoever, within that state for fourteen years." Fitch never availed himself of this privilege, and in 1798, the New-York Legislature repealed that act, and granted the same privileges to Robert R. Livingston, under certain restrictions as to the time when he should accomplish his object. Nothing material, however, was effected until April, 1803, when Robert Fulton joined with him. By successive acts, the exclusive privilege was secured to these gentlemen for thirty years, and between April and July, 1808, they gave the required evidence, "that they had constructed a steam-boat of more than twenty tons, propelled by steam, more than four miles an hour, against the stream of the Hudson, between New-York and Albany." Thus were twenty-two years expended in bringing to perfection this noblest of human inventions.

The steam-boat was thirty years since a most improbable vision, now it is as common as a coach; and we cannot realize that the day ever was, when its practicability and expediency were doubted. Should

we not take warning from this lesson, and endeavour to save ourselves from a delay of twenty years in the great improvements, which are now in agitation? Had the steam-boat existed in 1786 in its present perfections, how wonderfully would the wealth and happiness of the country have been increased. Let every man in Massachusetts regard this circumstance, and lend his aid to stimulate our unwilling government to introduce, immediately, into this commonwealth the rail-roads and rail-way cars of England. While we are doubting about practicability and expediency, our brethren of England, of Maryland, of Pennsylvania, and of New-York, are realizing mines of wealth. We in Massachusetts are not yet in the secret, we must apply ourselves to this subject if we have any patriotism, any regard for our posterity, or pride for our own characters.

But, to return from our digression, we here give a view of the boat, and, immediately following, is Mr. Fitch's description.



"It is to be propelled through the water by the force of steam; the steam engine is to be similar to the late improved steam engines in Europe, those alterations excepted; the cylinder is to be horizontal, and the steam to work with equal force at each end thereof.—The mode of forming a vacuum is believed to be entirely new; also of letting the water into it, and throwing it off against the atmosphere, without any friction. The undertakers are also of opinion that their engine will work with an equal force to those late improved engines, it being a twelve-inch cylinder; they expect it will move with a clear force, after deducting the friction, of between eleven and twelve hundred pounds weight—which force is to be applied to the turning of an axle-tree on a wheel of 18 inches diameter. The piston is to move about three feet; and each vibration of the piston turns the axle-tree about two-thirds round. They propose to make the piston to strike thirty strokes in a minute, which will give the axle-tree about 40 revolutions. Each revolution of the axle-tree moves twelve oars five and a half feet; as six oars come out of the water, six more enter the water, which make a stroke of about eleven feet each revolution. The oars work perpendicular, and make a stroke sim-

ilar to the paddle of a canoe. The cranks of the axle-tree act upon the oar about one-third of their length from their lower end, on which part of the oar, the whole force of the axle-tree is applied. The engine is placed in about the thirds of the boat, and both the action and re-action of the piston operate to turn the axle-tree the same way."

FROM THE LOND. MECHANICKS MAGAZINE.

"Sir,—I will thank any of your correspondents for information on the following questions: Who was the inventor of chain rigging? Was ever a patent granted for it? (I have some reason to suppose there was about the year 1804.) In what name was it granted?—when?—and for how long?

Whether such rigging has been used in the Royal Navy, East India Company's service, or any other service? and to what extent?

I am, Sir, yours, &c. Y. Y."

Presuming that the author of the above enquiries would be gratified with any information touching the subject of them, even from a quarter which many in his country consider as "the ends of the earth," we have inserted the subjoined article which we received from its author, who had previously published it in Boston, in 1822, and which will be completed in our next number. We would state that chain rigging is not used at all in the American Navy, unless chain cables may be considered as coming under that head. By way of parenthesis, we state that a very extensive manufactory of this article exists in that part of this city called South Boston.

We have further to observe that chain rigging to some extent, has for many years past been used in our merchant service, in several ports of the United States, but to what extent, we are not now exactly prepared to say, but we are promised an article on this subject for our next number, which will go more fully into particulars.

LEVER TRUSSES AND SLINGS,

FOR SHIPS.

"The undersigned, masters of ships and vessels belonging to the port of Boston, on which "Well's Iron Lever Trusses and Slings," have been used, hereby certify, that on trial we found them to possess the following advantages over the common mode of hanging and securing a yard to the mast:

1st. A saving of time and labour: As a yard fitted in this mode can be more easily

and expeditiously braced about, by less strength, than is required in the common mode. The trusses being dispensed with, the time that is expended in casting off the truss-tackle-falls, and sending aloft to clear the trusses is saved; and there is certainty that the yard can be wheeled round by the braces in this mode, as the obstruction by the trusses in the old mode, which frequently prevent the yard's turning, is removed. We found that a sail could be more quickly furled in this mode by the same number of men, and that all the movements of a yard were more freely and easily effected. Time and labour being thus saved, the safety of the ship, cargo and crew is thereby promoted, as their preservation frequently depends upon expedition in wheeling about the yards or in taking in the sails.

2d. There is less wear and tear to the rigging and sails, and consequently to the mast, spars, and hull, of the vessel. The yard standing always at a distance from the mast, they never come in contact with each other, and there is therefore no rubbing or chafing by friction. The yard being at all times steady, and obtaining no other motion than is intended to be given it by the lifts and braces, there is no rubbing against the rigging by a yard when braced up. When a vessel is scudding directly before the wind, the steadiness of the yard prevents the sail from chafing against the fore part of the top by the rolling of the vessel, and for the same reason rolling-tackles are never required. The tacks are more easily brought down, as the yard always hangs by its centre. There is no further use for mats, leather or battens on the masts and yards, as the causes which rendered them necessary are removed in this mode.

3d. The first cost of fitting a yard after the new mode we believe to be less than it is in the old, and eventually much cheaper. The new mode is of simple construction, its materials are durable, and it will seldom, if ever, want to be repaired. The materials of the old mode are of a perishable nature, and being more exposed to wear and tear, frequent repairs are necessary by substituting new for the old rigging; and in six years, we may calculate, that all parts, except those which are of iron, must be totally renewed: but we see no reason why the new mode should ever require much repair from usual wear and tear, or why it should not last and continue to be of service as long as the vessel herself.

We believe that the new mode is fully

as strong as any other now in use, and with which we are acquainted, and having used them in all weathers and in all seasons and climates, we have every reason to be satisfied with their operation.

As, therefore, time, labour, and expense are saved, and as the plan fully answers all the good purposes for which it is designed, and as the invention is not only new and useful, but combines neatness with its utility, we recommend all those who are interested in navigation to use it in preference to the old mode.

Jan. 25th, 1821.—(Signed)—Charles Jennison, ship *Atlas*, having used them while master of that ship three voyages to Europe.

July 23th, 1821.—(Signed)—William Lithgow, brig *George*, three voyages from Boston to Havana.

Aug. 31st, 1821.—(Signed)—John Smith, ship *Mount Vernon*, voyage to Savannah, Liverpool, &c.

Sept. 6th, 1821.—(Signed)—Amos Hilton, barque *Garland*, three voyages from Boston to St. Petersburg.

Sept. 15th, 1821.—(Signed)—J. W. Lewis, ship *Falcon*, to Liverpool.

Oct. 12th, 1821.—(Signed)—David Low, Jr. barque *Garland*, one voyage from Boston to St. Petersburg.

Oct. 24th, 1821.—(Signed)—John D'Wolf, ship *Helen*, one voyage from Boston to Havana and St. Petersburg.

In addition to the foregoing advantages, I add, that there is no chafing of the sail against the top and consequently there is no necessity of reefing any head sail to prevent it, and when the sails are suddenly taken aback, great benefit arises from the ease and expedition with which the yards are braced about.

Nov. 14th, 1821.—(Signed)—Joseph Jackson, ship *Atlas*, from Boston to New-Orleans, from thence to Liverpool, and back to Boston.

March 13th, 1822.—(Signed)—William Hutchinson, brig *Nile*, from Boston to Trieste, Messina, and back to Boston.

April 10th, 1822. Having used the above named trusses on the ship *Mount Vernon*, under my command, on a voyage from Boston to Savannah, Liverpool, and back, I have every reason to be satisfied with their operation. During the passage from Liverpool to Boston the weather was uncommonly violent and tempestuous, which gave a fair trial of their strength and utility, and I fully agree in the preceding opinions; and to the number of advantages above enumerated, I add, that owing to the movement of the yard upon its centre, the wear and tear to the top-sail sheets is much less than in the old mode of rigging a yard: in proof of which the service on the top-sail sheets of my ship is not worn off, nor do they want any repair after having been two years in use.

(Signed) Jabez Howes, Jr.

This may certify, that on my passage from this port to New-Orleans, in the ship *Atlas*, I carried away the mizzen-mast by the board, sprung the head of the main-mast and split several sails in a heavy squall. The yards were all fitted with iron trusses, and none of them broke, which is

a proof of their being very strong: I am induced to make this statement in consequence of hearing that a ship has lately arrived at this port with her yards fitted in this way, and has broken some of the trusses on the passage.

Boston, April 16, 1822.

(Signed)

Joshua Atkins.

June 5th, 1822.—(Signed)—Alexander Scudder, of brig Pacific, voyage to Valancia, Malta, Palermo, &c. and back to Boston.

June 4th, 1822.—(Signed)—N. Mahew, of brig Wethered, of Boston, one voyage to South America and back to Boston.

In addition to the advantages of the new, over the old, mode of rigging, as specified in the above certificates, are the following:

1st. On the old mode the yard is usually suspended from the top, by a staple through the fore cross-tree: consequently the whole weight of the yard, sail and appendages are upon the top. From the point of suspension to the mast, the trestle-trees are levers, and from the trestle-trees to the deck, the mast is a lever. The trestle-trees and mast may be considered a bent lever, on which the weight of the yard &c. at the top is the power, the mast at the deck the prop, or fulcrum, and the heel, or the lower end, the resistance or weight. Now it is clear that the effect of this power must be severely felt on the hull or body of the vessel, and the greater the distance the power is from the prop, or fulcrum, the greater is the effect.

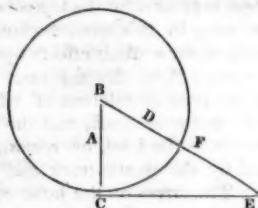
On the new mode, the yard is not suspended from the top, consequently the effect of the lever of the trestle-trees is destroyed. The yard hangs from two points of the mast and therefore the weight of the yard and sail is brought lower down upon the mast, one half being at the upper point of suspension and the other at the lower, which is opposite to the centre of the yard.* Consequently the mast must be considered as diminished in length equal to the mean distance between these two points, and therefore the effect of the power upon the hull is decreased in the same ratio. The beneficial effects of this must be particularly obvious when a vessel is sailing upon a wind: for the lower down upon a mast the pressure of the sail is brought, the less is the stress, and the easier it is to the ship.

* This follows from the rule in statics,—that when three forces keep each other in equilibrio, they are respectively as the three sides of a triangle, drawn parallel to their directions and terminating each other. The eye of the crane from which the yard is suspended being in the centre of the crane, one half of the weight is at the upper and one half at the lower end of the crane at the mast. Hence the effect is manifest.

This advantage cannot be completely obtained with the old mode of rigging: for a part of the effect is brought upon the top, and a part only upon the mast at the trusses, which being of rope will yield to the effort of the wind and sea, and the truss-tackle being secured at the after ends of the trestle-trees, in heavy weather the pitching of the vessel is felt almost entirely upon the head of the mast immediately above the top. It is seldom that a yard is so effectually trussed in as to cause any great proportion of this stress to be felt by the trusses and the mast at this position. If at any time the trusses are slack, the effect upon the mast is severe, for the topsail and course below may, in this case, be considered as one sail, so far as their effects operate upon the masts. Now the top-mast acts as a lever, the prop or fulcrum of which is the cap of the lower mast, and the weight, or resistance, is the heel, or rectangular hole, formed by the trestle-trees and the cross-trees. The stress on the head of the lower mast by the top-sail only is great, and when the pressure of the course is brought upon it, the stress is greatly augmented, as well by the pressure of the sail as by the distance at which it acts. By this augmentation of power, it must be evident, that not only an unnecessary strain is brought upon the hull, but the masts are endangered. From these causes may be attributed the frequency of springing the lower mast at or near to the head thereof. These evils are entirely removed by the new plan. The yard is always retained by the truss to the mast, and in no case is any of the stress of a fore or main-sail brought elsewhere than it ought to be, viz. upon the mast to which it is respectively attached. By bringing the effort of the sail nearer to the hull, it acts with greater effect in propelling the vessel through the water, and the same effect is produced by the steadiness of the yard and sail. The less motion a sail has, not only is the force and action of the wind upon it more full, but the vessel is more steady on her course and under better command of her helm, particularly when scudding. For these reasons a vessel will sail better with her yards fitted on the new than on the old mode.

2dly. The yard on the old mode being suspended by a chain or rope, and having no fixed point of action, or centre of motion, either in topping or bracing, the direction of the chain varies with the movement of the yard, and is perpendicular only when the yard is square and hangs freely, and in

this position, if the yard move freely round, the relative distance of the points of suspension at the top and centre of the yard, is the least, being then perpendicular to each other; but in topping, trussing in, or bracing round the yard, the chain and point of suspension varies from a perpendicular to an oblique direction. Hence if the yard moved freely in a horizontal plane, or was suspended by a line perfectly elastick, the distance of the centre of the yard to the point of suspension at the top would increase in the proportion of secant of B to radius, in the triangle B, C, E, the chain being made radius for this purpose agree-



bly to the diagram, where A is the chain, B the point of suspension of the yard at the top, C the centre of the yard, E a horizontal line; but in bracing the yard the line A moves from C to F and gets out of the perpendicular direction and becomes oblique, as the line D. Hence in bracing round a yard, if it moved freely by hanging on an elastick line, the distance of its centre and the point of suspension would increase in the proportion D, A. But the slings, or material by which a yard is hung, are not elastick; hence the distance must be always the same; and the yard, in bracing, instead of being found at the angle E, will be found at the point F—therefore the yard, in bracing, has a compound motion, which is resolved in the single one at F and rises in proportion as the line D : A. But in bringing the yard to the position F, in bracing, not only the yard is to be raised, but the stress occasioned by the resistance of the top-sail sheets, is to be overcome; besides, the quarter blocks being placed at a distance from the centre of the yard, and secured below to the top-sail sheet bits, the distance between the quarter block and bits is increased by the turning of the yard, upon the same principle as that before stated relative to the points of suspension, whereby the windward sheet is tightened and the leeward slackened alternately, as the vessel is upon either tack. There is, therefore, a compound resistance to be overcome, which

requires more power than is necessary merely to brace the yard. 1st. By raising the yard and appendages—2d, the consequent resistance of the top-sail sheets by the increase of distance—3d, by the tightening the windward sheet by the increase of distance of the quarter block from the bits to which it is secured. The first requires a power equal to the weight of the yard and sail—the second a power sufficient to overcome that which has been applied to the sheets in sheeting home the top-sails; and third, a power to distend the windward sheet sufficiently to equal the increase of distance occasioned by the bracing. These several causes combined occasion a resistance in bracing the yard, which makes the application of a much greater power necessary to effect this operation, than would be required without such resistance. Nor is this loss of power the only inconvenience; The wear and tear and strain upon the sheets are greater, and this stress is felt at the bits, and is the occasion of the leaks which are so common about their vicinity.

(To be continued.)

A GIGANTIC STEAM-BOAT.

"The Dutch have been engaged for the last five years in constructing and equipping a steam-boat of extraordinary magnitude, in order to facilitate the communication between Holland and Batavia. It has four masts, is about 250 feet long, has cost upwards of 100,000*l.*, and has been appropriately christened the *MONSTER*. In consequence of her great length, she hung when going off the slips, and it was some days before she was fairly launched; a circumstance which gave the wits of Paris occasion to remark that their Dutch neighbours were so determined to excel all other nations in the magnitude of their steam-boats, that they had built one so long, that it was several days running off the stocks; a wonder only to be matched by the story of the giant who had so magnificent a stride, that it took three days to sail between his knees. One of the most remarkable features of this enormous vessel is, her extreme narrowness as compared with her length; her greatest breadth of beam being only about 32 feet. Although it is now four years since she was launched, it was not till within the present month that she was ready for sea. On the 7th inst. she descended the Maas, with the intention of making a trial of her powers in the German ocean, before proceeding to the East Indies.

and it is not improbable, therefore, that she may favour the Thames with a visit.

The great size of this vessel will bring to the recollection of our readers the Columbus, which was built in the river St. Lawrence, in 1824, and made the passage to England in safety, but was afterwards broken up on account of her unmanageable bulk. We shall not be surprized to find that a similar fate awaits the Monster, and for a similar reason. The Columbus was larger than this Dutch rival, by some fifty feet in length, and eighteen in breadth; but not so much so as to constitute any material difference between them."—(London Mech. Magazine.)

COMMUNICATION.]

[FOR THE MAGAZINE.]

OBSERVATIONS ON THE PATENT LAW.

The object of this article is to point out some of the hardships arising from the defects of the Patent Law of the United States, and by thus bringing the subject before the publick, to elicit the remarks of those most competent to devise remedies for the present defects of the system. With the view of bringing the greatest possible amount of information to the subject, both with regard to the defects of the system, and the best remedies to be applied, I shall earnestly recommend the perusal of a course of Essays by Peter A. Browne, Esq. on the Law of Patents, to be found in the Franklin Journal, published in Philadelphia, Vol. 2d, year 1826, page 19, beginning with No. 7, of Essays on Mechanical Jurisprudence.—These Essays appear to be the result of a laborious and thorough investigation of the subject, giving the decisions of the English and American Courts, in most of the important cases arising under the Patent Laws, with judicious remarks by the author. The information contained in these Essays would save, to lawyers, much laborious research, and to the applicants for Patents, many of those difficulties, which the want of such information involves them in. The immediate object of my particular recommendation of these valuable Essays is, that our ingenious mechanicks and Patentees, (suffering as much from a want of a knowledge of the Patent Laws, as from a defect of the laws themselves,) when answering the call now made on them, to state their particular grievances under the Patent system, and their views of the best remedies for those hardships, should be enabled to come to the subject with that general knowledge of it, that, in applying a remedy for one evil, they incur not a greater in the substitute. Though

but poorly qualified myself, for the task, and ignorant of law, I shall venture to state a few of the hardships of our Patent system, and suggest what appears to me would render it less onerous; this I do solely with the view of bringing abler pens to the subject, and that relief may ultimately follow. One of the most formidable objections to property in Patent Rights, is, the entire uncertainty, at all periods of the time for which the Right may be granted, whether it is worth any thing or not—nay, in fact, whether it may not prove worse than nothing, by involving loss of time, expensive law-suits, disappointment and mortification. Let me state a case; suppose that A. invents a machine or article for common use, or an improvement on either, and being truly desirous of avoiding all interference with the Rights of others, as well from a sense of justice, as of policy in avoiding law-suits and expense, trouble and disappointment, takes every possible pains to learn if the machine or article of his invention is new—and to this end he first enquires of the dealers and manufacturers of the article, (a substitute or improvement on which he has discovered,) whether they have ever seen or heard of any such substitute or improvement, and learning that they have not, A. next refers to books of science, and there discovering nothing similar, he lastly applies at the Patent Office and finds nothing there to interfere with his discovery or invention. Having now taken all known means to ascertain if he can safely take out a Patent, at least, such means as in reason should suffice, he applies for a Patent, and incurs the much more serious expense of instructing workmen in new operations; overcomes the prejudices against what is new, and having with much expense and trouble, fairly introduced the new or improved article to publick favour, and beginning to receive some returns for his heavy disbursements, B. a rival, learns that something similar to A's new or improved article, has been seen in some remote quarter of the globe, or perhaps in some old lumber loft—B. follows up the scent and possibly discovers the inventor who made the article ten or twenty years before, but from neglect of proper pains to bring it into use, or imperfection of the article itself, it does not succeed, and no application having been made for a Patent, and consequently no publick record made of such invention, the publick is not benefited; but after a lapse of ten or twenty years, when A. discovers or invents what proves to

be similar to B's useless invention, and by proper pains brings it into publick use and benefits society, and further by complying with the requisites of the law, has it publickly recorded at an expense of thirty dollars, so that it cannot be lost to future generations; B. comes forward and claims A's invention as his own, or as one that he has purchased, voids A's Patent, takes his taught workmen and cleared field, and reaps the harvest sown by another. Should B. fail to find either an article or the Inventor of an article similar to A's, he has only to make one, give it the appearance of age, ascertain when A. made his discovery, claim an earlier one for himself, bribe two false witnesses to swear to his invention and its date, and he is able to wrest from an honest and ingenious man his all. Suppose B. not to succeed in establishing his own claim, he still puts A. to much trouble, and perhaps to an expense that he can poorly sustain; and if B. is malicious, having learned in the course of the trial wherein he failed, may stimulate some wretch like himself to institute a new suit, and should A. have the courage and the means to contend again in law, and again be successful, there is no security against other suits; and the loss of time and money thus expended, has often proved more ruinous to Patentees, than would have been the loss of their Patent Rights, and many an honest Patentee has been obliged to see his rights pirated with impunity, from the want of means to defend them, or a conviction from dear bought experience, that the loss was a less evil than contending for them in law. It may be said in reply to the above supposed cases of fraud, that nothing is secure against the attempts of rogues—but I would ask if sound policy on the part of the publick, should not afford in some way, greater security to the property of the ingenious Inventor than it now has? and although this sort of property may be held light, by many, it should be considered that it constitutes the sole wealth and support of many worthy and ingenious citizens, whose rights have as just a claim to support as those of any other class, and in point of policy, if it were possible, even a greater claim, for what has experience showed with regard to bargains or contracts between Inventors and the publick? Why that the publick, without incurring risk or expense, is always the gainer if the invention is good, and not a loser if bad, though good or bad, the unfortunate Inventor is generally ruined. Such an unequal state of things cannot last long, and if

the publick fails to protect its servants in their honest earnings or rights, it must sooner or later be without them. What were the death bed feelings and advice on the subject of Patents, of the worthy and ingenious Oliver Evans, of Philadelphia? Assembling his children and grand-children about his bed, he had his plans of inventions and discoveries all brought forward and burned in their presence, solemnly warning them to have nothing to do with Patents and Inventions, if they had any regard for their property or peace of mind.

I would suggest as a remedy to the great and fundamental objection to Patent property, its constant insecurity or liability to involve its possessor in ruin, a law, similar to the law which secures to the fair possessor of real property, who first records the same, in preference to him who had equal or prior title, but neglected the necessary form of recording. Patent property derives its value from a publick record; and all transfers, to be legal, must be recorded; and why should the bona fide Inventor who *first* records his invention, be ousted by him who comes *after*, when but for the first taking out a Patent and proving (at his own expense and risk,) the thing to be good, the second might never have thought of, or ventured on such a hazard?

Notwithstanding the *first* recorded invention would take precedence, it would still be subject to legal investigation, where there was suspicion of fraud; and should it be found that any invention, similar in principle to the one Patented, had been in use before the date of said Patent, the proprietor of said invention should be suffered to use the same, but not to take out a Patent or dispose of Rights for others to use it, and this would appear to be all that he had contemplated from his invention, as without a Patent, he could neither secure an exclusive right to himself, or dispose of them to others. Any alteration in the law, that would render Patents more secure, would benefit some, while under the present laws it is ruin or disappointment to all. The insecurity to Patents already treated of, arises principally from priority of discovery taking precedence of priority of Patent.

I will now consider a farther grievance, to which many of the foregoing remarks will apply; this is the law that requires "that the discovery or invention should be new, *not known or used before.*" Now it appears to me that the law should point out what evidence would be satisfactory, "that the in-

vention was not known or used before" the application for the Patent.

What other or better means than applying to the manufacturers and dealers in the article, for which the Inventor claims a new substitute, or an improvement?—then to books of science?—then to the Patent Office? And these proofs of novelty should be made satisfactory proofs in Courts of Justice, that the ingenious Inventor, who (having these proofs of his discovery being new,) takes out a Patent, and incurs great expense in time and money, may be protected. For under the present laws, no sooner has he placed his discovery in a train of successful operation, than something similar in principle to his invention, is dragged from secrecy, and (possibly after a use of fourteen years) a Patent claimed, which secures a second fourteen years to the exclusion of the honest Inventor, who at once records his discovery, in order that the publick should have the benefit of it in fourteen years from its birth, which is the true spirit and meaning of the contract or bargain between the Inventor and the publick. For by this honest dealing on the part of the Inventor, the publick secures to itself what otherwise might be lost. A law making the first recorded Patent, (otherwise good,) valid against all subsequent Patents for the same invention, would prevent many of these difficulties which now arise from delay in taking out Patents.

A third grievance arises from the circumstance that a mere inadvertent defect in the Patent makes the same void. When no fraud is intended, this should not avoid a Patent.

There appears to me an apparent defect in the Patent system, in making no provision for the introducer of a useful machine or article of use that is new to the country. England, in her Patent system, makes no distinction, when a Patent is asked for, whether it comes from the brains of one of her subjects, or from the workshops of a rival, provided it be useful and new to the kingdom; and this policy appears to be wise and just, as it holds out an inducement to her subjects, when visiting foreign countries, to look after what is new and useful, and to incur the expense and trouble of obtaining models, drawings, and the requisite information, for the successful introduction and use of the same. This is often attended with an expense and labour little, if any, inferior to that of the original Inventor, and the benefit to the country being the same, there appears no reason why the reward should not also be the same. Every thing

that is new and useful, is an addition to our capital in trade, which finds employ for itself, and in the hands of our ingenious countrymen, is generally improved upon, so as to give us advantages over those from whom it was imported.

I will conclude these remarks with suggesting what appears to me to be an inconsistency, as well as an impolicy in our Patent Law. Said Law provides that an improvement in any machine or useful manufacture, shall be entitled to a Patent; and said Law also declares that a mere change of form and proportions, does not entitle to a Patent. Now suppose, as has often happened, that such change of form and proportions in a machine, produces a better and a cheaper article—suppose such change enables you to make two such articles where you before made but one, or by such change of form and proportions in a manufacture, said manufacture becomes applicable to a new and useful purpose. In all these cases, there is a manifest improvement, and a Patent for such improvements could injure no one, for if made on articles enjoying a Patent, they could not affect said Patent without the concurrence of the Patentee, who might be as much benefited, as the discoverer of the improvement, and if made on articles where Patents had expired, or on articles not Patented, could interfere with no one, and I can see no reason why new and useful effects produced by changing the forms and proportions of old machines, should not be as much entitled to Patents, as the same or similar effects produced by changing the forms and proportions of levers and wheels. I hope the object of improving our Patent system will be thought worthy the attention of some of our statesmen, as I know of no way in which they could render a greater benefit to their country, or procure for themselves a more meritorious or lasting popularity.

Note. The term article, and article of use, is synonymous with the term useful manufacture, all meaning what is entitled to a patent.

SLATE.

Among the very great variety of articles of transportation which would come to this place from the vicinity of the Connecticut river, on the Rail-Road, is the article of *Slate*, which abounds in many places in great abundance.—Mr. Bruce, a respectable slater, who formerly resided in Boston, but has moved to Brattleborough, has a quarry of

Slate at Guilford, about 2 miles from the Connecticut, from which he gets out, every year, not less than 1200 tons. It is brought to the landing in Vernon, and from thence transported to Hartford and New-York. Freight to the former place \$5, with an additional charge of \$2 to the latter place. These Slate are of a very approved quality; they are got out from 10 to 24 inches long. Many of the buildings in this city are covered with them; we would name the Manufacturers and Mechanicks Bank, the Marlboro' Hotel, the entire range of stores on the south side of Cornhill, (late Market Street,) and many other places. The roofs, in every case, we believe, have proved perfectly tight. There is also a fine and very extensive quarry at Lancaster; many of which have also been used in this city. The quarry at times is some few feet under water; but on a cheap conveyance being furnished from that town to Boston, to encourage the working of the quarry, this obstacle will soon yield to the operation of the steam power pump. The Slate are not quite so large as the first mentioned, but are said to be good. Slate are $2\frac{1}{2}$ to 3 square to the ton—a square is 100 superficial feet. The price is from \$8 to \$10 laid, or \$7 per square, not laid.

COMMUNICATION.]

[FOR THE JOURNAL.]

RAIL-ROADS.

MR. EDITOR—If you consider the following hints, touching some of the necessary enquiries on viewing a line for a Rail-Road, as of any importance, you are at liberty to insert them in your proposed work.

1. Examine scientifically the actual feasibility of the proposed route—the comparative feasibility with other routes, as it respects soil, elevations, obstructions of land or water—the facilities in point of materials, and the quantity and situation of materials.

2. Are there materials suitable for the construction of a Rail-Road in the vicinity of its location?

3. Is the transportation sufficient to defray the expenses of construction and maintenance of a Rail-Road?

4. Are the goods, &c. such as would probably pass on the Rail-Road, or are they such as would be more likely to pass by other conveyances?

5. Are there any staple articles of transportation, such as Coal, Slate, Soap-Stone, Marble, Iron, and other ores that would come under this description, for downward freight, which will afford a sure freight, in

case that a load could not be readily obtained of such articles as are in immediate demand—and are they such articles as will always be wanted for use?

6. By what conveyance do the articles of transportation now pass—are they conveyed by the owners, or by hired teams—at what seasons are the greatest quantity of goods transported—what is the rate per ton for transportation, at different seasons—what is the lowest rate of any articles, at any season?

7. In which direction is there the greatest amount of transportation, and how, in regard to each season of the year—and also of those articles which would probably pass on the Rail-Road?

8. Expense of conveyance to other places, say to any of the principal neighbouring towns?

9. What are the opinions and spirit of the people on the route, and what facilities will they afford in granting land, materials, and labour, and in subscribing for stock?

10. The relative prices of produce, one place with another?

And lastly. To gain the most correct information, I think it would be best not to ask directly, relative to the object you have in view, but collect facts from different persons who are best acquainted with those subjects, which go to make up the whole, and then compare them, and draw your own conclusions—otherwise you will be very likely to get the wishes and prejudices of other people, instead of the truth, or even probability.

COMMUNICATION.]

[FOR THE MAGAZINE.]

The following rule "for proportioning the Fly Wheel of a Steam Engine" may be of use to some of the Subscribers for the Magazine, and with this view, it is transcribed from Partington's Descriptive History of Steam Engines.

RULE: Multiply the number of horse power of the engine by 2,000, and divide it by the square of the intended velocity of the fly wheel, in hundred weights. *Example.*—To find the weight of a fly wheel proper for an engine of twenty horse power, supposing the fly wheel to be 18 feet in diameter, 56 feet in circumference, $\times 22$ revolutions per minute, $= 1232$ feet motion per minute, $\div 60 = 20\frac{1}{3}$ feet motion per second for the motion of the circumference of the fly wheel. Then $20\frac{1}{3}$ feet motion per second squared, $= 420\frac{1}{9}$, and twenty horse power $\times 2,000 = 40,000 \div 420\frac{1}{9} = 904$ cwt. of the wheel required.

The above rule was used by Messrs. Murray & Wood, for proportioning the fly wheels to the steam engines constructed under their directions.

COMMUNICATION.]

[FOR THE JOURNAL.]

Mr. Editor—Travelling a short time since on the Connecticut river, I put up at a publick house with a man who informed me that he was in a one horse wagon with a load of cheese, bound down to Boston. I enquired of him what quantity he had; the price he expected to obtain for it; how long he should be absent from home, &c. He replied that he had 1000 lbs. and of his own making; that he expected to obtain 7 cents per pound for it; that he should be three days on the road each way, spending one day in the city to dispose of his cheese, purchase his returns, and load up; that his expenses would be for himself and beast not far from \$8, provided he met with no accident, and not including his own time nor that of his beast, nor the wear and tear of his wagon. I asked him what he thought of a Rail-Road for a mode of conveyance for his cheese? He said "he had heard tell of it, but was entirely ignorant what it was;" he then proceeded to make enquiries of me in relation to it. I told him that to apply its advantages to his own case, I would state, that his cheese could be taken to Boston on a Rail-Road for \$1,50, and the same weight of freight back, if not greater in bulk than his load of cheese, for the same sum; that he might have his cheese sold and his articles of return procured by a responsible store-keeper in Boston, without charge, while he, with his horse and wagon, could remain at home, be employed on his farm, and himself not absent from his family an hour. All which he candidly acknowledged appeared reasonable. And on going into a fair calculation, and to him satisfactory, of the difference between the new and present mode of conveyance, it resulted in a clear saving to him, in the mere getting his produce to market, of not less than 20 per cent. of his whole load!

Let our farmers look to it; not forgetting the maxims "that time is money;" and "a penny saved" &c., handed down to us by the farmers and mechanicks best friend,

FRANKLIN.

COMMUNICATION.]

[FOR THE JOURNAL.]

Mr. Editor—The time approaches when we may reasonably expect from the wisdom of our state government a decision upon the important question of Rail-Roads in this commonwealth. That Rail-Roads must, and will soon, supersede all other modes of internal conveyance, can hardly be doubted

by any one who has given the subject the least attention. When we consider the cheapness of construction, and support of Rail-Roads, compared with canals; that unevenness of surface is no impediment; that it will work all the year; that its speed can be graduated at almost any imaginable rate; there cannot be a moment's doubt that the age of canals is past. It is now for the legislature to determine whether they will give to the lands and the labours of the husbandmen of this commonwealth their just value, by affording them a market; or whether they will permit them to remain in their present depressed state, because it costs more to carry the produce to market than it will sell for, owing to the facilities afforded by our neighbouring states. By the great internal improvements, and facilities for conveyance afforded by other states, the farmers of the western states can transport their produce to the Boston market much cheaper than many counties in this commonwealth. This state of things ought no longer to exist. Our yeomanry of the interior demand this improvement, and they ought to be gratified in it. It is a reasonable request.

Taking it for granted that Rail-Roads must be made, the next question is, shall they be built and owned by the publick; or, by private individuals? and, it appears to me too important an interest to be vested in individuals. If a grant is made to individuals, other grants will be wanted; and the question of invasion of vested rights will be continually arising, and obstructing all farther improvements. But, if the Rail-Roads are owned by the publick, this question cannot arise; and the commonwealth may continue to build as many as may be found beneficial or profitable to her citizens. That Rail-Roads would benefit the whole people, by greatly increasing the price of lands and of produce on the route—and within twenty miles of the route, on either side; that it would give a new spring to agriculture, to commerce and manufactures, and the fisheries; that it would benefit all classes of the community, from the extensive landholder to the day-labourer, cannot be doubted.

An undertaking of this kind would injure no one. It would afford employment to our industrious population. The money expended would only change hands: it would still be among us. The work should be done by our own citizens; and the very expense of the work would then become a new capital for other improvements, and a

subject for taxation. The next question is, on what route shall we commence this great work? and, it appears to me that it should be from Boston, in as near a direction to the mouth of the Mohawk river as the land will permit. This route would pass the Connecticut above the expensive locks, at a point to intercept the whole trade of the Connecticut valley in Vermont and New-Hampshire. Branches would be brought on from Keene, Brattleborough, and other points to the north; and might be brought on from all beneficial points from the south. This termination would meet, and render available to us, all the great New-York improvements. It would open to Boston and our sea-board the trade of the whole western world, and I have no doubt, that the mere pleasure travel on this route would more than pay the interest of the money that the road would cost. I do not doubt that this route would yield a profit of more than twelve per cent. upon the capital.

The publick ought, therefore, to keep so great and so profitable an interest in their own hands; and it would shortly produce a fund that would relieve the people from taxes, and furnish a rich fund for the commonwealth. In time of war, this route would be of immense importance. An army, munitions, and provisions, could be transported from one extremity of the country to the other in a very short time, and at very small expense. Our rulers should no longer slumber over this immense improvement. The country will not much longer permit them to rest in quiet. The time will soon arrive, when no man, from the interior at least, will dare to return to his constituents, and tell them that he has done nothing on the subject of a Rail-Road. And it ought to be done before new channels are established in other directions. Now is the time to begin; and we shall learn all we want to know, before the road can be ready to go into operation. The legislature ought to be extremely careful into whose hands they trust this great operation; lest publick convenience be sacrificed to private interest.

A FARMER.

The Congress of the United States, the Legislature of Massachusetts, and the City Council of Boston, have each, in their constitutional relations, been recently addressed by their respective chief magistrates; and on the great subject of internal improvement there is no discrepancy in their sentiments; there is no distinction in their interests;

they all breathe one language, touching the spirit and march of publick improvement, which engages publick attention in almost every section of the whole twenty-four states of this union. We proceed to make an extract from the messages or speeches of each. President Jackson says:—

"The agricultural interests of our country are essentially connected with every other, and so superiour in importance to them all, that it is scarcely necessary to invite to it your particular attention. It is principally as manufactures and commerce tend to increase the value of agricultural productions, and to extend their application to the wants and comforts of society, that they deserve the fostering care of government. Every member of the union, in peace and in war, will be benefited by the improvement of inland navigation, and the construction of highways in the several states."

And thus, governor Lincoln:

"Of the matters of prominent concern, that of the Rail-Ways will press with almost engrossing interest. With a reference, therefore, to former communications to the Legislature, and especially to that which I had the honour to address to your consideration at the commencement of the political year, for the general views, which I continue, confidently, to entertain, of the interest of the state, in the effectual encouragement of those enterprizes which are adapted to facilitate intercommunication, and relieve the community from the excessive expense and tedious labour of the present mode of land transportation, I beg leave to repeat the recommendation, that some decisive measures should promptly be taken to give to the country, at no distant day, such improvement.—A mass of testimony is furnished to the occasion and the advantages of Rail-Roads, which, if it fails to unite all in designating the preferable courses for their location, will yet induce, in every one, a desire for their enjoyment. The astonishing results of recent scientific experiments in Europe, in the application of steam to produce a moving power, by which time, and distance, and weight are alike overcome, to a degree almost incredible, may well inspire a confidence in this manner of conveyance, which neither the incredulity of the timid, nor the obstinacy of the prejudiced, can longer resist. It has been said, with probable correctness, that the newly invented steam carriages, which are designed for use between Manchester and Liverpool, will bring those places, though more than thirty miles remote from each other, nearer together, in a social and commercial point of view, than the extremes of London now are. The expense of travelling by them, it is calculated, will be reduced three fourths, and the time two thirds,

while the accommodation to the passenger is far superiour to that afforded by stage coaches. The saving of cost in the transportation of heavy merchandize is estimated to be even still greater. The progress too, which has been made in our own country, in the execution of those stupendous works in which several of the states are engaged, has evinced, that there are few obstacles in nature too formidable for a persevering industry and labour successfully to remove. Surely, after the experience which has been had, no well informed man will question the practicability of laying Rail-Roads over the roughest places of our commonwealth, nor will any be found to deny their advantages, if means can but well be provided, for their accomplishment.

The assistance of the government, in some manner, and to some extent, in aid of individual enterprise and exertion, must be given to the work. I hesitate not to say that, without this, nothing of moment will be seasonably accomplished."

"If the general depression of business, and the peculiar and unusual pecuniary embarrassment of individuals, throughout the country, be objected to proceeding at the present time, it may be satisfactorily answered, that it is to revive the spirit of enterprise, to give employment to labour, to restore trade, and open new sources of profit and of wealth, that these works should now be undertaken. The creation of stock upon the faith of the state, to such amount as the commonwealth may be interested, eventually redeemable, as it doubtless would be, from the income and advantages of the improvements, will occasion no direct tax upon the people, beyond the accruing interest, and to this, even, might be applied the proceeds of the sales of the public lands, and other contingent payments into the treasury."

The Mayor of Boston gives his sentiments upon this subject in the following language :

"The transcendant success of the Rail-Road system in England, as well as the encouraging result of the experiment so far as it has been attempted in this country, support the hope that Massachusetts will not linger in the rear of that enterprise from the issue of which no other state has more to expect than herself."

It appears, from the following paragraph, copied from the N. Y. Mer. Advertiser, that, in 1809, Mr. Jefferson gave a decided opinion adverse to the practicability of the New York Grand Canal. How clearly does the circumstance show that the wisest and most watchful are not infallible!—(Palladium.)

"When the project of a canal between Erie and the Hudson was first communicated by judge Forman to Mr. Jefferson, the

latter replied, "It is a very fine project, and may be executed a century hence. You talk of making a canal two hundred and fifty miles through a wilderness! It is little short of madness to think of it at this day." This was in 1809. Mr. Jefferson lived to see the project completed. The canal was not, indeed, made through the wilderness: that wilderness had become one of the most remarkable examples of human industry to be found in the world. In a subsequent letter to De Witt Clinton, dated Dec., 1822, he says, alluding to the preceding conversation, "Many, I dare say, think with me, that New-York has anticipated, by a full century, the ordinary progress of improvement." Mr. Jefferson is also reported to have said, "that he had remarked it was a century too soon; but he was then convinced that he was a century behind a just estimate of the march of improvement in this country."

In addition to the above, it may be remarked, that, at the time the subject of the canal was under consideration in the New-York legislature, the whole amount of transportation which was estimated to pass upon it, in any one year, for some years after it was open, was 200,000 tons; whereas, when the canal went into operation, the actual result was rising 600,000 tons!—(Ed. Mag.)

COMMUNICATION.]

[FOR THE JOURNAL.

Passing an hour at Brighton, a few weeks since, I was invited to a neighbouring field, where I saw three droves of fine cattle, from the county of Washington, in the state of New-York. The whole number of head was not far from 300, the sales of which, at an estimated average weight of 1000 pounds, at 4½ cents per pound, amount to 13,500 dollars; the principal part of which sum, I was told, would be taken out of the market and carried to the city of New-York, and there laid out in goods, and thence transported up the North river to said county: whereas, was there a facility of communication (say by means of a Rail-Road) from hence, as exists at New-York, both places being about equi-distant from where the owner of these cattle belonged, the money would not thus be drawn out of the Boston, and other banks in its vicinity, but would be laid out here.

The above is by no means a singular case; but it is one of a great number which is continually occurring of a similar character; and our legislature has it in its power to prevent the repetition, much longer, of such a disastrous state of things, of which this is but a specimen. Here, too, lies an advantage, which presents itself in almost every instance of similar competition; and

it is this, that the communication from New-York, say on the North river, is closed part of every year, while that from this place would never be interrupted. MIDDLESEX.

RAIL-ROAD TO THE HUDSON.

The bill for the incorporation of a company for the construction of a Rail-Road from hence to the Hudson river, in which the state was to be interested one third, say to the amount of \$1,100,000, has been under close discussion in the House of Representatives, for about ten days past, and will probably terminate in a rejection, by this body, of the bill. The time and the expense of legislation will not, we trust, be considered as wholly lost, which has been expended in this debate, in which great talent has been displayed, particularly by the friends of the measure, and very many and highly important facts elicited. The public excitement has been very great, and must have manifested itself to the members from the country, in the daily thronged galleries of the House, and must have been felt also, by the members of the House, in passing through the avenues to the hall of legislation. The public attention must now be principally directed, in whatever is to be done by way of Rail-Roads, to individual enterprise; an opportunity for which will be afforded, we trust, by the passage of two bills, the present session, the one for the construction of a road from hence to the line of the state of Vermont, at Northfield; the other, from hence to the town of Lowell. Whether such encouragement can be held out in these charters, either by the state on its part, authorizing a subscription to a reasonable amount of the stock, or by securing the corporations against competition within a certain term of years after the opening of the roads, if within a given period, (the former of which securities would be every way the most preferable mode,) time alone must determine. Encouragement has been held out in the course of the recent debate, that something by way of subscription, say to the amount of \$150 or 200,000 on the part of the state, would be done; and we do most earnestly hope that the vital spark of public enterprise in our legislature has not become so wholly extinct, but that something of this kind may yet be accomplished.

MASSACHUSETTS

CHARITABLE MECHANICK ASSOCIATION.

This popular and growing institution held its annual meeting for the choice of officers and other business, on the evening of the 7th ultimo.

From the report of the committee on finance, it appeared that the whole amount of the funds of the Association is \$15,092 16; the greater portion of which is invested in productive stock. There have been admitted during the past year 53 members. In the same period 6 have died. The whole number of members is 408.

The report of the committee of relief was presented and accepted, from which it appeared that about \$350 had been distributed during the year to poor and disabled members, or to the families of such as have deceased. This sum is exclusive of the sum of \$40 paid to the family of each member deceased.

About \$500 had been previously appropriated to the support of a school for apprentices, and the course of scientific lectures which commenced in October last.—(Boston Courier.)

Officers for the present year.

DANIEL MESSINGER, *President*,
JOSEPH T. BUCKINGHAM, *Vice Pres't*.
JOHN COTTON, *Treasurer*,
JOSEPH LEWIS, *Secretary*.

TRUSTEES.

ABRAHAM CALL,	EDWARD CLARK,
JACOB TODD,	URIEL CROCKER,
JAMES M'ALLISTER,	SAMUEL S. WILLIAMS,
JOHN KUHN,	MARTIN BATES, and
THOMAS WHITMARSH.	

Mr. S. T. ARMSTRONG, the late President, declined a re-election. Mr. GEO. W. OTIS, the late Vice President, was re-elected, but declined serving.

The committee of Relief, for the present year, consists of Messrs. G. W. Otis, Frederick Lane, Charles Wells, James Brown, David Francis, John Wells, George Darracott, John Rayner, James Barry, Jun.

Lecturers for the present season, Introductory, Joseph T. Buckingham; Edward Everett, Dr. Grigg, Dr. Robbins, Dr. J. V. C. Smith, Ebenezer Bailey.

BOSTON MECHANICKS INSTITUTION.

Officers for the present year.

DANIEL TREADWELL, *President*,
DAVID MOODY,
CHARLES WELLS, } *Vice-Presidents*,
ALEXANDER PARRIS, }
FRANCIS C. WHISTON, *Recording Sec'y*.
GEORGE B. EMERSON, *Corresp. Sec'y*.
STEPHEN FAIRBANKS, *Treasurer*,
SETH BASS, M. D., *Cabinet Keeper*.

Directors, Ebenezer Bailey, Alpheus Carey, Timothy Claxton, John Cotton, George Darracott, Henry A. S. Dearborn, Phineas Dow, James K. Frothingham, Gerry Fairbanks, Isaac Harris, Benjamin Loring, John Ware, John Dagget, Gedney King, Ephraim Marsh, John Pierpont, John P. Thorndike,

Lecturers, Hon. Joseph Story, Warren Colburn, Esq., Professor Farrar, Hon. William Sullivan, Dr. John Ware, Dr. J. W. Webster.

THE BOSTON SOCIETY FOR THE DIFFUSION OF USEFUL KNOWLEDGE.

Officers for the present year.

Hon. DANIEL WEBSTER, *President*,
Hon. JOHN PICKERING, } *Vice-Presidents*,
Hon. NATHAN HALE, }
JACOB BIGELOW, M. D., *Correspond'g Sec'y*.
HORATIO ROBINSON, M. D., *Rec. Sec'y*.
HENRY F. BAKER, Esq., *Treasurer*.

Directors, Rev. William E. Channing, Samuel T. Armstrong, Esq., John Park, M. D., Charles C. Nichols, Esq., John P. Thorndike, Esq., Abbott Lawrence, Esq., Charles G. Loring, Esq., William T. Loring, Esq., Thomas B. Curtis, Esq., Chandler Robbins, M. D.

Lecturers, Hon. Daniel Webster, Hon. Edward Everett, Hon. Alex'r H. Everett, Walter Channing, M. D., Francis Lieber, P. D., Rev. Alonso Potter, John Park, M. D., Chandler Robbins, M. D., Hon. William Sullivan, Hon. John Pickering.

* * Several communications are unavoidably postponed; they shall receive due attention in our next number.